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ABSTRACT

The Manufacturing Technology Program (MTP) is a partnership between General Motors, the United Auto Workers, and the public schools in Flint, Michigan, that originated as a preapprenticeship program and has since expanded into a program preparing youth for manufacturing. The programs' effectiveness was examined through a comparison group-based study designed to determine the MTP's net impacts. Data on the grades, school attendance, and employment and earnings of students enrolled in the MTP in fall 1992, 1993, 1994, and 1995 were compared to data regarding students who were not MTP participants but who were otherwise very similar to participants. Participation in the MTP was associated with higher high school grade point averages, average class ranks, and attendance rates at the secondary level and higher average attendance rates at the postsecondary level. MTP participation also had positive impacts on three labor market measures: employment rates, wage rates, and average hours worked. The following were among the program improvement recommendations offered: develop pre-MTP skills enhancement classes for elementary-level and grade 9-10 students; institute work-slot rotation in grade 11; improve coordination of school- and work-based learning activities; establish support mechanisms for female MTP students; and monitor/reduce per-student costs. (Contains 16 tables/figures.) (MN)

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ED 413 440

An Evaluation of the Manufacturing Technology Partnership (MTP) Program

Upjohn Institute Technical Report No. 96-007

Kevin Hollenbeck

February 1996

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PREFACE

Important changes are taking place in secondary vocational education programs across the country. The latest reauthorization of the federal vocational education legislation, the Perkins Act, emphasizes the articulation of secondary and postsecondary programs through Tech Prep collaboration and calls for the integration of academic and vocational education. The 1994 School-to-Work Opportunities Act calls for partnerships between business/industry/labor and education in the form of work-based and school-based learning. The Goals 2000 legislation pushes educational programming toward the implementation of skill standards.

The Manufacturing Technology Partnership (MTP) Program anticipated many of these federal initiatives before they were on the front page of Education Week or were heralded by politicians and educational reformers. Conceived and developed using local resources, the MTP program demonstrates the feasibility and advantages that the "new" vocational education/school-to-work programs can expect. It includes articulation of secondary and postsecondary programs. It includes collaboration between business and labor organizations and education. It integrates academic and technical skills. Besides predating much of the national attention, MTP has taken the step of attempting to evaluate its success. One hopes that educational administrators and policy makers will follow its lead in this respect, as well.

The W.E. Upjohn Institute received a grant to conduct a rigorous impact evaluation of MTP. This report represents the product of that effort. We are grateful to the Mott Foundation for their financial support and to the staff of the MTP program for their exceptional level of cooperation. In particular, we would like to thank Susan Richvalsky, Director of MTP, for her

help, openness, and interest in our study. Susan is clearly devoted to a total quality approach for her program. In addition to Susan, Pat Leaveck and Janie Yelinek were very helpful in scheduling our data collection efforts and in supplying information that we needed. The MTP instructors, students, school district's staff, and employer/union partners were all very cooperative and gracious with their time when we interviewed them or asked for information. We would like to thank all of them individually, but we will ask them instead to accept, as a group, our grateful thank you.

Several individuals at the Upjohn Institute helped to conduct the evaluation and contributed importantly to this report. Bridget Timmeney was a co-investigator for the process study and contributed to the development of data collection instruments, to the actual site visits, and to report preparation. Becky Jacobs organized and conducted the data preparation and analyses. Her organizational and computer skills were instrumental to the study. Evelyn Iversen assisted in many aspects of the analyses and completion of the project during fall 1995. Claire Vogelsong and Ellen Maloney were responsible for producing questionnaires, much correspondence, and reports. We gratefully acknowledge and thank all of these individuals for their contributions to the effort. Of course, the usual disclaimer applies—any and all errors and inconsistencies are the responsibility of the author.

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EXECUTIVE SUMMARY

The Manufacturing Technology Partnership (MTP) Program has established itself as one of the country's premiere school-to-work programs. In the short span of a few years, the program has matured from concept to full operation. What is remarkable is that MTP was conceived, developed, and launched locally, using local resources, at a time when the national school-to-work initiative was just germinating and there were few models or resources upon which the Flint, Michigan partnership could rely. The program has encountered its share of impediments and growing pains as would be expected of a pioneer; but its excellent reputation at the local, state, and national levels indicates that the partnership organizations and individuals affiliated with the program have blazed a trail that others will follow.

The MTP Program originated as a preapprenticeship program, but it has evolved into a more general school-to-work program that prepares young people for careers in manufacturing. It was designed to be a school-based program that prepared 11th and 12th grade high school students to take the General Motors/United Auto Workers (GM/UAW) skilled trades apprenticeship test. A particular goal was to foster the participation of minority students and women. The program, as originated, supplemented a formal curriculum in manufacturing at the Genesee Area Skill Center (GASC) Technology Center with work-based experiences at GM. Over time, however, additional employers joined the MTP team, and the presence of these new partners has resulted in a broadened program that prepares youth for manufacturing, not just skilled trades in the automotive sector.

This study presents the findings and recommendations from an evaluation of the MTP Program. A particular emphasis of the evaluation is the estimation of the impacts of the MTP Program on students. After all, no matter how highly regarded an educational intervention is, success must be measured by its effects on student outcomes. The intent of the impact study is to answer the question of how outcomes for the students who encounter MTP compare to what would have happened to these young people if MTP did not exist. That is to say, the focus of the study is on determining *net* impacts rather than *gross* impacts. Net impacts are determined by using a comparison group design. Comparison groups of students who were observationally similar to the first two classes of MTP students were developed. Then the high school experiences, postsecondary program attendance, and labor market outcomes of the MTP students were compared to the comparison group members. The differences in outcomes between the MTP and comparison groups are attributed to the MTP Program.

The analytical findings suggest that MTP had relatively positive net effects, particularly in high school. The average high school grade point averages and average class ranks were higher for the MTP students than for their comparison group counterparts. Furthermore, MTP dramatically reduced absences. Comparisons of coursetaking patterns were somewhat less positive. As would be expected, the MTP students had considerably higher levels of vocational education credits than did the comparison group students. But the question remains as to what courses they were not taking. On a positive note, it turns out that MTP did not diminish the number of math or science courses for the first MTP class. In fact, the first MTP class ended up with more math and science credits in addition to having more vocational credits relative to their comparison groups. However, the evidence suggests that the second MTP class substituted some

vocational education (or MTP) courses for math and for science relative to their comparison groups.

At the postsecondary level, the average attendance rates were generally higher for the MTP classes than for the comparison groups. However, these findings are not very strong empirically nor are they statistically significant.

A final outcome that we examined was labor market measures, such as employment rates, wage rates, and average hours worked. The evidence suggests that MTP bestows young people with advantages in all three areas. Half of the first MTP class were seniors when they enrolled in MTP and, for them, the latest employment data that we collected measured their status almost two and one-half years after high school graduation. We found that 80 percent of these individuals reported themselves to be employed at an average wage of $10.69 per hour as compared to just under 70 percent of the comparison group who reported an average wage of $5.92. (Presumably this differential is due partially to a number of ex-MTP students becoming employed at the GM Truck and Bus Plant.) The average number of hours worked per week was virtually identical for these two groups. When the entire first MTP class (both those who started as seniors and as juniors) is compared to all of the comparison group members, the employment rate, wage rate, and average hours of weekly employment are all greater. The wage advantage is almost 75 percent—$9.79 per hour compared to $5.59.

The most recent employment data that we collected from the second MTP class and its comparison group are confounded by the fact that many of these young people are in the first semester of a postsecondary program. So noting, we found that the average wages earned and the average hours of work per week reported by the MTP students are greater than for their

comparison group counterparts. On average, the second MTP class members were earning $5.81 per hour and working 31.2 hours per week as compared to $5.20 and 25.2 hours per week.

In addition to addressing the net impact questions, the evaluation included a process study that examined the day-to-day operation of the program. Over the course of a year and a half, project staff visited the program several times and conducted structured interviews with individuals who held a stake in it. They interviewed students, teachers, administrators, employers, postsecondary administrators, and representatives of school districts and other organizations that were involved with MTP.

Our site visits spanned the second and third year of instruction in MTP and gave us the opportunity to interview students in both of the first two MTP classes. Our general observation was that the program changed considerably over time and that each class was distinct. The evolutionary nature of the program has, for the most part, been positive. The program has been learning by doing. In its first year, the program accepted some students who did not meet all of the entrance requirements and found that it had to dismiss a substantial number of students who did not progress sufficiently. As a consequence, the program has been more careful in maintaining its acceptance criteria.

The curriculum has changed over the years in response to employers' suggestions and instructors' experiences. The changes have not been dramatic in scope, but rather they have been of a marginal nature with each change intended to improve the program. It strikes us that the flexibility and adaptability that the MTP Program has demonstrated fits well the milieu within which the program's employer partners operate. It is quite appropriate that a program that strives

to provide students with world-class manufacturing skills should itself have the flexibility and adaptability that are hallmarks of today's manufacturers.

A change that strikes us as less positive is the retrenchment on promises made to students and the lack of curriculum coordination between the GASC Technology Center (also called the Skill Center) and postsecondary education. All parties rationalize carefully that there have been no broken promises, but it is clear, from early case study notes and program literature, that the intent of the program was to support a student's progress toward an associate's degree in Manufacturing Sciences as long as he or she passed the apprenticeship test and made adequate progress. It should be noted that the federal Job Training Partnership Act (JTPA) Program, which was to have supported some training, has been substantially curtailed since the beginning of the program. Thus part of the retrenchment emanates from federal cutbacks in training.

This report presents several findings and recommendations. However, several shortcomings of the evaluation merit mention. First, the MTP Program has been developing and changing over the course of its short lifetime. Curriculum, employer partners, students, instructional staff, and funding levels have all changed, for example, which makes the program a moving target to evaluate. The results reported here pertain to the first two classes of students at the Skill Center and are relevant to the program as it operated between fall 1992 and fall 1994. The conclusions may not characterize the program that operates today or its students.

Second, the student outcomes that have been tracked include high school, postsecondary education, employment, and earnings through September 1995. This timeframe allows the measurement and observation of student outcomes for between one-half year to about two and one-half years after high school graduation. However, the impacts of the MTP Program on

students may be greatest after several years have passed. (The MTP Program may result in skilled trade apprenticeships, for example, or it may result in postsecondary courses of study that take several years to complete.) In this case, not enough time has passed to draw a reasonable picture of the program's success.

Third, although the impact evaluation method on which we relied was the most rigorous that was feasible, it is still open to criticism. We attempted to construct comparison groups of students that were similar to the MTP students, but we know that there were still important differences between the MTP students and the members of the comparison groups. Finally, the study's sample sizes are modest. This emanates from the fact that the size of the MTP classes are limited and from the difficulty in enlisting comparison group members. Furthermore, the outcome data that have been tracked were collected over a period of three years, and sample attrition occurred.

These limitations need to be kept in mind in interpreting the findings and recommendations within this report. Despite facing challenges along the course of its development from concept to the classroom, the MTP Program has achieved many successes. Perhaps its most successful accomplishment is that in a rather short period of time, the MTP Program has become a pre-eminent school-to-work program. It has earned considerable public attention in Genesee County, in the State of Michigan, and even in the nation. It is the core from which Flint area educators are developing their school-to-work programming. The program has expanded along virtually all of its dimensions. In its first year of classes, MTP worked primarily with a single school district and with a single employer (the Truck and Bus Plant). In ensuing years, many more districts have sent students to MTP. Also, more and more employers have become program partners. In the

span of a few years, the program has gained countywide recognition from educators, from employers, and from organized labor.

The program's successes have been recognized in the Genesee County area, but also on the national scene. In June 1994, President Clinton signed the national School-to-Work Opportunities Act while sitting at a desk that was designed and fabricated by MTP students. Several MTP students and staff attended the bill-signing ceremony, at which the president recognized the exemplary nature of the program.

To earn its renown and to have become so well rooted in the community, the MTP Program must be offering effective program features. This appears to be the case. For example, the program has successfully crafted and implemented a dynamic curriculum. The curriculum integrated vocational and academic skills—before such integration became in vogue nationally. The curriculum development team has consistently included academic teachers. Another strength of the program is that its teachers came from industry and had years of applied experience in the field they were teaching. In addition to careful attention to the curriculum and staff experience, the MTP Program has tried to provide instructors and students with appropriate equipment. Finally, employers seem to feel ownership in the program. Several employers have made strong commitments to the MTP Program as a way to improve the supply of skilled workers in the future.

Of course, the bottom line for the MTP Program is the students it is serving. Through our site visits and data collection, we became aware of some student success stories, and presumably program staff could relate many others. The type of success at which the MTP Program is aiming is epitomized by a minority individual in the first MTP class who scored in the top five percent

on the apprenticeship test. He has been hired into a skilled trades apprenticeship at one of the area GM plants and is well on his way to a stable, high-paying career within a year after graduating from high school. Another student, a minority female, from the second MTP class has established a long-term employment relationship with a small employer. She worked for this employer during her first two years in the program, and the employer has subsequently decided to sponsor further education for her in an engineering discipline at General Motors Institute (GMI). A staff person at the employing company told us that without MTP, the company would have been highly unlikely to take a chance on a high school student, like this young lady. Besides these particular student success stories, it should be noted that MTP has achieved a high level of participation of females. Over one-third of its graduates have been young women.

The MTP Program has achieved many successes, but it also has several challenges to address. Perhaps its greatest challenge is to integrate successfully a postsecondary component into the program. The program did not carefully track where individuals attended postsecondary programs, nor did it attempt systematically to stay in contact with former students. Furthermore, the program's partners have been conflicted about whether financial support promises were made to students and by whom. Because of personnel and structuring changes at the two-year institutions in the area, former MTP students have been essentially cut loose to make it on their own.

A second major challenge for the program is the integration of work-based and school-based learning. An important premise of school-to-work programs is that the context of work activities will reinforce or enhance learning. Students will get to see the practical application of their skills and knowledge, or skills will be learned in a hands-on fashion. However, it seems

clear that there must be significant coordination between the employers and program instructors to achieve these ends. With MTP, we observed a considerable level of input from employers into what got taught in the school-based portion of the program. But we found scant evidence of any attempt to coordinate what was being done in the workplace with what was being learned at school.

We conclude the report with the following set of programmatic suggestions:

- **Develop pre-MTP skills enhancement classes for 9th or 10th graders or for elementary levels**
- **Reinvigorate the postsecondary component of the program**
- **Institute work-slot rotation in the 11th Grade**
- **Improve the coordination of school-based and work-based learning activities**
- **Re-energize the MTP Advisory Committee**
- **Establish support mechanisms for female MTP students**
- **Monitor program per student costs and strive to reduce them**

School-to-work programs such as the MTP Program have the potential to improve significantly the educational experiences and career prospects of America's young people. The extent to which these programs achieve their potential should be consistently monitored and evaluated. The MTP Program has achieved successes, but as with the manufacturing sector of the economy, it should be striving for a total quality approach. We hope that the findings and recommendations of this study will provide the impetus for a feedback loop that enhances the program.

1. Introduction to the Evaluation Study

The Manufacturing Technology Partnership (MTP) Program has established itself as one of the country's premiere school-to-work programs. In the short span of a few years, the program has matured from concept to full operation. What is remarkable is that MTP was conceived, developed, and launched locally, using local resources, at a time when the national school-to-work initiative was just germinating and when there were few models or resources upon which the Flint partnership could rely. The MTP Program has encountered its share of impediments and growing pains as would be expected of a pioneer, but its excellent reputation at the local, state, and national levels indicates that the partnership organizations and individuals affiliated with the program have blazed a trail that others will follow.

This study presents the findings and recommendations from an evaluation of the MTP Program. A particular emphasis of the evaluation is the estimation of the impacts of the MTP Program on students. After all, no matter how well reputed an educational intervention is, success must be measured by its effects on student outcomes. The key impact question is hypothetical; it is one that the evaluation could not answer. *How would the lives of the MTP students be different if they had not participated in the program?* The closest that we could come to answering that question was to monitor the educational and employment outcomes of MTP students and a group of students who resembled the MTP students in many measurable ways and to *attribute* differences in those outcomes to the program. In other words, the evaluation answers the question, *How are the educational and economic outcomes for MTP students different from the outcomes for other students who did not enroll in MTP but who are, in many other ways,*

similar to the MTP students? The study then infers that these differences may be explained by participation in MTP.

In addition to addressing the impact question, the evaluation includes another important study. This is a process study that examined the day-to-day operation of the program. Over the course of a year and a half, we visited the program several times and conducted structured interviews with individuals who hold a stake in it. We interviewed students, teachers, administrators, employers, postsecondary administrators, and representatives of school districts and other organizations that are involved with MTP. The process study has two purposes. First, the information that we learned from our interviews and observations provides a context for analyzing the impact data. It helped to frame the questions we asked in surveys that monitored student outcomes and to construct hypotheses to test with the data we collected. The second purpose of the process study is to assess the operation of the program. As an objective third party, the study team tried to identify those program aspects that were succeeding and those aspects that were not working. During the course of the evaluation project and in this report, we have developed several recommendations for the MTP administration to consider based on findings from the process study.

This report presents several findings and recommendations. However, several shortcomings of the evaluation merit mention. First, the MTP program has been developing and changing over the course of its short lifetime. Curriculum, employer partners, students, instructional staff, and funding levels have all changed, for example. This makes the program a moving target to evaluate. The results reported here pertain to the first two classes of students

at the Skill Center and are relevant to the program as it operated between fall 1992 and fall 1994. The conclusions may not characterize the program that operates today or its students.

Second, the student outcomes that have been tracked include high school attendance, grades, and coursework; and postsecondary education, employment, and earnings through September 1995. This timeframe allows the measurement and observation of student outcomes for between one-half year to about two and one-half years after high school graduation. However, the impacts of the MTP Program on students may be greatest after several years have passed. (The MTP Program may result in skilled trade apprenticeships, for example, or it may result in postsecondary courses of study that take several years to complete.) In this case, not enough time has passed to draw a reasonable picture of the program's success.

Third, some of the outcome data come from the responses to surveys that we administered to the students. The accuracy of these data depend on how well the students interpreted the questions and how accurate they were in responding. Also, some of the outcome data come from high school transcripts. These data are likely to be accurate, but high schools vary considerably in what information is recorded and how it is measured. Thus, there may be inconsistencies in our transcript data.

Fourth, although the impact evaluation method on which we relied was the most rigorous that was feasible, it is still open to criticism. We attempted to construct comparison groups of students that were similar to the MTP students, but we know that there were still differences between the MTP students and the members of the comparison groups. For example, some of the comparison group members lived in a different county—Saginaw County. Most of the comparison group members, however, resided in Genesee County (where MTP is located), but

some of them applied for but did not get chosen to participate in MTP. It is a strong assumption, then, to ascribe the differences in educational and employment outcomes solely to MTP. In fact, personal characteristics and location may account for part of the differences.

Finally, the study's sample sizes are modest. This emanates from the fact that the size of the MTP classes are limited and from the difficulty in enlisting comparison groups. Furthermore, the outcome data that have been tracked were collected over a period of three years, and sample attrition occurred.

These caveats should be kept in mind in interpreting the findings of this study. Those findings are suggestive of positive student outcomes. The acclaim that the program has achieved seems well merited. The report documents many successful aspects of the program. It also draws attention to challenges that the program has faced and will continue to face, however.

The second chapter of the report provides background information on the history and curriculum of the program. Chapter 3 describes the process study and its findings. Then, chapter 4 turns to the impact analyses of MTP on student outcomes. Finally, chapter 5 discusses the successes and challenges that MTP has faced to date and provides suggestions for program improvement that administrators might consider.

2. The MTP Program

2.1 Program Background

The MTP Program originated from a study that was done as part of the UAW-GM Quality Education Program (QEP). Since 1987, the QEP program has promoted collaboration between the GM/UAW partnership and the education community through various projects in which local joint (GM/UAW) training coordinators work with area educators. In one QEP project, a local teacher developed and analyzed a workforce attrition prediction program for the GM Truck and Bus Flint Metal Fabricating Division (hereafter referred to as the Truck and Bus Plant). This program predicted a shortage of skilled trades persons because of an aging workforce that was nearing retirement and a general labor market that was tightening. Furthermore, experience had shown that individuals who had taken the skilled trades apprentice test immediately after graduating from high school had low success rates. The local joint training coordinator and the human resources director at the plant took these predictions seriously and initiated the concept of a preapprenticeship program to be offered collaboratively with the public schools and other community organizations.

It is important to note several aspects about the genesis of the program. First, the program impetus came from a single UAW local at a specific plant. The Truck and Bus Plant is one of 14 GM facilities in Flint. It employs approximately 3,500 workers, who are members of the UAW. The subsequent evolution of the program has demonstrated that the idea has gotten little support or acceptance by other GM plants or union organizations in the area. Second, the program's originators had two objectives: to develop a reserve of well-trained students/workers who could fill skilled trades slots and to attract minority and women apprentices. Third, in the initial stages,

the MTP Program was envisioned as a preapprenticeship program. The GM/UAW skilled trades apprentices go through a formal program that involves thousands of hours of work experience and rigorous formal education. MTP was intended to develop high school students to be able to enter such apprenticeship programs.

The GM/UAW staff persons who initiated the program developed a partnership among several Flint-area entities—the Truck and Bus Plant, the Genesee Area Skill Center (GASC) Technology Center, Mott Community College, Baker College, and Jobs Central, which is the local service delivery agency for the federally sponsored Job Training Partnership Act (JTPA). As they developed the concept of MTP, the partners decided to pilot test the idea with a single, small school district rather than opening it up to all of the 21 districts served by the Skill Center. One of the GM staff had ties to the Beecher School District, which is an urban district with a significant minority enrollment. It was an easy decision, then, to pilot test the MTP idea with a class from Beecher.[1] In recruiting the first MTP class, apparently the Skill Center could accommodate more students than those who applied and were accepted from Beecher because several students were enrolled from Flint Central and Southwestern High Schools.[2]

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[1]At the time that the MTP Program was developed, the JTPA Program had "experimented" with the notion of determining as eligible for youth services an entire school. This was intended to save administrative time and paperwork spent on eligibility determination. If the school were located in economically disadvantaged areas, then the students were eligible. Another advantage of using Beecher to pilot test the MTP program was that it was to be a JTPA-eligible school. Unfortunately, JTPA never fully implemented the idea of having a school of attendance be the sole determinant of eligibility. Thus Jobs Central had to determine the eligibility of all MTP students, after all.

[2]The first class included one student from Montrose as well.

The program operates from the Genesee Area Skill Center, which is an area vocational school that serves the high schools in Genesee County. The Skill Center offers training in fields such as automotive trades, construction trades, cosmetology, health occupations, food service, and others. For most of these programs, students are transported to the Skill Center for a two- or three-hour block class each day. The design of the MTP program followed that model, wherein the MTP students would come to the Skill Center for a block class. But in addition, the MTP students would work at the Truck and Bus Plant after school and in the summers. Another way that MTP differed from many of the other programs at the Skill Center was its inclusion of a postsecondary education phase. The program's goals were to get students to pass the skilled trades apprentice test at a high enough level to qualify for an apprenticeship and to develop students academically to the point where they would not require remediation at the postsecondary level. If they qualified for an apprenticeship, students would receive the requisite on-the-job training and formal postsecondary training at Mott Community College at company expense. If students passed the apprentice test (i.e., scored above the national average) but did not score high enough to qualify for an apprenticeship as an "outsider," then MTP would support the students up to and through an associate's degree in a manufacturing science.[3]

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[3]The extent to which students were promised postsecondary support and from whom support would come have been contentious issues over the life of the program. Note that two of the MTP founding partners were postsecondary institutions that offer Associate Degree programs—Mott Community College and Baker College. During our interviews, we learned that these institutions thought that the business partners (i.e., GM/UAW), Jobs Central funding, or the MTP Program would cover the tuition costs. On the other hand, the GM/UAW staff, Jobs Central, and the MTP administration maintain either that no tuition guarantee was ever made to the students or that they expected the postsecondary institutions to use their own institutional scholarships to cover tuition costs that were not covered by federal or state grants-in-aid. Because none of the partners have been willing to commit to the postsecondary tuition costs, students now

The director of the program, Susan Richvalsky, is a Skill Center employee—her Skill Center title is Business/Industry Liaison. The MTP Program became a separate department within the Skill Center, and its teachers came from other programs within the school. The director reports to the principal of the Skill Center, who is accountable to the Skill Center's board.[4] The director of the program is responsible for setting the overall direction, for the fiscal performance of the program, and for interacting with the program's partnering agencies. The program has an assistant director, Pat Leaveck, who manages the internal operation of the program at the Skill Center and who interacts with school districts for recruitment and general operational purposes.

In the first year of instruction, 1992-93, the program had three teachers who were full-time Skill Center teachers, assigned half-time to MTP and half-time to other departments. Two other members of the staff "team" included a math teacher and a language arts teacher. Neither taught, but rather they assisted in integrating math and language arts into the curriculum. In the second year of the program, 1993-94, when student enrollment doubled, one of the half-time teachers became full-time to MTP, and another half-time teacher joined the program. Recently, a science

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entering the program are clearly told that there is no tuition guarantee unless they are accepted into an apprenticeship.

Notes from early project meetings indicate that the intent of the program was to provide postsecondary tuition to students who passed the apprenticeship test above the national average (although we have to program document that states this explicitly). These project notes further indicate that these guarantees were meant to be "last dollar" support; that is, after other scholarships or grants. Our notes are not clear on who was to be the source of these funds, however. The issue of the postsecondary tuition guarantee is addressed in detail in subsequent chapters of the report.

[4]The Genesee Area Skill Center was the first area vocational school in the state and is funded through a charter millage in the county. In most other circumstances in the state, area vocational schools are operated by the Intermediate School Districts. However, in Flint, the Skill Center is independent from the ISD and has a separate board.

teacher has joined the team for the purpose of integrating physics into the curriculum. As with the math and language arts staff persons, he does not do any teaching for MTP. Rounding out the staff is a full-time clerical employee.

The partners who developed the program met formally as an advisory committee, which still exists although the number of partners has increased. This committee seems to be strictly advisory in nature and in recent years, seems to have become dormant.

As might be expected, it took several months of program planning and development before MTP could enroll students. Curriculum was developed during summer 1991 and summer 1992 by Skill Center and area high school teachers (through the QEP program). It was conceived, developed, and implemented with funding from local sources only. Curriculum development and student recruitment came out of the Skill Center budget and in-kind contributions of staff from GM/UAW. As the program was being developed, close collaboration occurred between the Truck and Bus Plant staff and the Skill Center staff on both the curriculum development and recruitment tasks. The program's intent was to use JTPA funds to pay the student wages, so Jobs Central was an important partner during the development period as well. The Truck and Bus Plant recruited its mentors during the year prior to the first enrollments, and Mott Community College provided them training.

Also during the 1991-92 school year, the program developed entrance criteria for students. The minimum requirements were an overall grade point average of at least a C; a grade of B in 9th grade algebra; grade 9 reading level; good attendance record; and an interest in manufacturing as a career. Students who applied for the program were given the General Aptitude Test Battery

(GATB) and were interviewed by a panel of four or five adults (staff from the Skill Center and from the Truck and Bus Plant).

The first class entered the MTP program in fall 1992. Funding for instruction and transportation between the plant and the Skill Center came out of the Skill Center budget. Funding for student wages came from JTPA. The Truck and Bus Plant mentors' salaries and compensation were paid by the company. After MTP had gotten underway, the program received external grants from the Mott Foundation and from the U.S. Department of Labor. These funds paid for administrative expenses, for equipment, for further curriculum development, for employer recruitment, and for a net impact evaluation. The Department of Labor funded a number of exemplary programs across the country as school-to-work demonstration sites. Labor was particularly interested in the MTP site because it was the only program nationally, at the time, in which organized labor played a supportive role.

The first MTP class was comprised of 50 students who came from four high schools and who were in either the 11th or 12th grade. The class had 40 students from Beecher High School, six students from Flint Central, three from Southwestern, and one from Montrose. Twenty-six of the students were 11th graders and the remaining 24 were 12th graders. All of the students were minorities or females. One of the hallmarks of the MTP program is the number of women that it has recruited and trained. This started early, as 21 (42 percent) of the first class were women.

The students in the first class were all assigned to the Truck and Bus Plant as a worksite. The plant decided to make MTP mentorships a full-time job and recruited and trained seven

individuals to work with the students. Worksite training occurred in a special facility in the plant that was converted for the purpose.

A major crisis that the program experienced was the dismissal of ten students at the end of the 1992-93 school year because of skill deficiencies. Naturally, many of the students and students' parents were quite upset, and much time and effort went into handling the situation. The program has been more rigorous in applying its entrance requirements subsequently because of this experience.

In the fall of 1993, MTP enrolled its second class—a total of 55 students. These students came from a number of high schools across the county—16 different high schools in all. As noted, the program required stiffer entrance standards than had been applied to the first class. MTP maintained its emphasis on recruiting minorities and females, but unlike the first class, this class included some nonminority, male students. A number of individuals in the second class, among both the minority and whites, had family incomes that were too high to qualify for JTPA-funded services. This was a problem for the Truck and Bus Plant, which was counting on using federal JTPA funds to pay student wages.

A second major crisis that the program faced, in fall 1993, was not having enough worksite placements for all of the second class. The Truck and Bus Plant employed 26 students, and four other employers supported an additional ten students. But 19 students did not have a worksite. This problem was eventually solved (into the second semester of the school year) through program attrition and recruitment of another employer. The students who were employed by the Truck and Bus Plant did not get onto "the floor" of the plant during the 1993-94 school year, but rather stayed in the training area of the facility, just as did the members of the first class.

In June 1994, the first MTP class, 32 students, "graduated."[5] The students took the first part of the apprentice test in June.[6] It should be noted that the Truck and Bus Plant spent a considerable amount of time and money in intensive tutoring of the students in spring 1994. Staff from the UAW had prototypes of the tests and gave the students a baseline and several follow-up assessments to track those areas in which the students were weakest. The company hired a tutor to work with each student in these areas in preparation for the test. The GM/UAW staff furthermore met with the families of the students to show them "prototype" test results and to explain to them how their students scored and where additional tutoring was required.

In fall 1994, MTP enrolled its third class of students. By this time, the program had recruited several additional employers. Students in this class worked at nine different worksites during the year, with the Truck and Bus Plant employing the largest share of them—22 of the students. The other eight firms worked with one or two students each. As described below, MTP made several significant curriculum changes that went into effect during this year.

The first MTP class completed their apprentice testing in the fall of 1994. Of the 32 students who took the test, only two scored below the cutoff. In other words, 30 "passed" at a score above the national average. Of these 30, one had a score that was in the upper five percent and entered a skilled trades apprenticeship (at another GM plant—*not* the Truck and Bus Plant).

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[5]Note that some of the members of this class had graduated from their high schools the year before. Those individuals dually enrolled in college and completed the second year of the MTP program.

[6]The apprentice test consists of two parts. The first part is a paper and pencil test of basic skills. The second part is a personal interview in which students present evidence of their technical knowledge and skills and are assessed on their verbal/interviewing abilities.

Seventeen of the other students have been hired at the Truck and Bus Plant as (nonapprenticed) general laborers. These students may qualify for skilled trades apprenticeships in the future, of course.

The second MTP class graduated in June 1995. This class was composed of 39 students, of which 26 had been employed at the Truck and Bus Plant. Those 26 took the apprentice test in June, but we do not have results to date. A particular success story from this class was a female whose worksite during the two years of the MTP program was Atlas Technology. Atlas is sponsoring her pursuit of a postsecondary engineering course of study at General Motors Institute (GMI) and is looking forward to a long-term employment relationship.

In September 1995, MTP enrolled its fourth class of students and has become a well-established program at the Skill Center and throughout Genesee County.

2.2 Curriculum

The MTP curriculum has evolved over the years, as would be expected. However there have been consistent efforts to integrate academic subjects into the curriculum and to develop the curriculum from an outcomes base. That is, the educators have worked closely with staff from the Truck and Bus Plant and other employer partners to determine the skills and knowledge that the employers feel should be required by the time the students complete the secondary school portion of the MTP program. Then they developed the curriculum so that those skills would be attained. Instruction is primarily delivered through hands-on practice with students grouped into teams. All classes emphasize written and oral communication skills. In fact, some of the students

complained during our interviews with them about too much writing and not enough hands-on practice.

MTP is a two-year program with three-hour blocks in each year (actually two hours and 20 minutes). In its first two years of operation, MTP followed the following design. In the first year (11th grade), the students were divided into three groups and rotated through three 12-week classes—principles of manufacturing, electronic circuitry, and machining. In the second year, the class was split in half and rotated between computer-assisted design (CAD) and manufacturing.

With these brief overviews of the program's development and its curriculum as background, the next two chapters of the report present the process and net impact results.

3. Site Visits to the MTP Program

3.1 Introduction

The primary purpose of the net impact evaluation of MTP is to determine how the program has made a difference in student outcomes. This is accomplished by analyzing statistically data collected from surveys and from school records about students in the first two classes of MTP and about comparable students. The analysis could be done without ever encountering the students in person and without ever observing program components. However, program evaluation data are much more meaningful and the interpretations of the results from analyses are much more accurate and useful if they are informed by observation and interaction with program stakeholders. Consequently, we conducted several site visits to the MTP program during the course of the study.

This chapter documents the site visits—when they occurred, with whom we spoke, and what types of information was gathered. The findings lead to some of the suggestions offered in chapter 5 about how the MTP *process* might be improved. The intent of the process study was to visit the program periodically and to gauge the opinions of various stakeholders about strengths and weaknesses of the program. The MTP program affects numerous individuals and organizations, so it was important to gather information from as many stakeholder groups as possible. Table 3-1 lists stakeholder groups. The number of groups listed there is large, but the table still masks the number of stakeholders because it groups into a single entity the dozen school districts that send students to MTP, and it groups into a single category the two postsecondary institutions—Baker College and Mott Community College.

Table 3-1

Stakeholder Groups Affected by MTP

Skill Center	Home School Districts	Truck and Bus Plant
MTP students	Teachers	Mentors
MTP instructors	Non-MTP students	Other employees
MTP administrators	Guidance staff	UAW officials
Skill Center administrators	Administrators	Plant management
Other students		
Other instructors		

Parents/Guardians	Postsecondary Schools	Employers, other than GM
Parents/guardians of MTP students	Administrative liaisons	Mentors
Parents/guardians of other students (e.g., unsuccessful applicants)	Students	Other employees
	Faculty	Management
	Administrators	

Partnering Agencies
Jobs Central
Flint Roundtable

It was not possible to interact with all of the groups listed in table 3-1, but we did try to garner a wide variety of opinions from a wide variety of stakeholders. The following sections of this chapter summarize the major points from the interviews that we conducted at each visit. These sections distill a considerable amount of notes into a few paragraphs intended to give the reader a sense of how the program developed over the time that spanned our visits, and what the major issues were at each point in time.

3.2 Visit 1: October 1993

At the time of the first visit, the program had just begun its second year of classes. The initial class had completed a year of classes at the Skill Center and after-school mentoring at the Truck and Bus Plant and had completed a summer at the plant. The second class had gone through the application and selection process and had just begun their classes at the Skill Center and their worksite activities. The characteristics of the second class differed from the first class in a number of ways. First, members of the second class came from 12 districts across the county, whereas the first class came mainly from Beecher High School. Second, all members of the second class were 11th graders. The first class had started with both 11th and 12th graders. Third, not all members of the second class were "slotted" to the Truck and Bus Plant. This facility did sponsor 26 of the students, though. One other employer began to participate in the program that fall, and this organization sponsored three students. Approximately a dozen students were not immediately placed.

During the first visit, we interviewed the MTP program director, two MTP instructors, two students from the first class, two students from the second class, and the (non-GM) employer. In addition, we observed instruction that was occurring in several classes.

Student retention was an issue that we discussed with the program director. One of the lessons that MTP learned in its first year of operation was that student basic skill levels, especially mathematics, were important in being able to handle the curriculum. A total of ten students (20 percent) of the first year's class were dismissed from the program because of low grades and test scores in MTP courses. (In addition, eight other students left the program over the course of its two years on their own accord.) The program director felt that the program would institute more

careful selection in future years to lessen the likelihood of having to dismiss students. Indeed, she felt that the program had already succeeded because the basic skills levels of the second class were higher than those of the first class.

The program director felt that two successes of the program up to this point were student attendance rates and the successful implementation of an outcome-based curriculum. She felt that the paid work experience was a strong incentive for regular attendance since the students could not go to work if they were absent from the Skill Center. However, she felt that at least some of the students were motivated by their interest and excitement in the subject matter. The curriculum had been customized by MTP instructors with input from GM/UAW staff. It needed some fine tuning, but all in all, had been successfully launched by the time of our visit.

Among the problems that the program director had encountered were student transportation to (non-GM) worksites. (The program transported the students to the Truck and Bus Plant, but did not have the resources to provide transportation to other sites.) Second, schools were inconsistent or very limiting in the credit values that they were assigning to MTP. The intent was that a year of MTP would be 3.0 Carnegie units, but some schools were not giving that much credit to students. Third, the program found parental disinterest in its recruitment efforts, even though this program involved a postsecondary component and had the potential to lead to quite lucrative and stable career options. Finally, the program director noted that she spent a considerable amount of time recruiting employers and that she had found that not all local unions were supportive. She felt that union politics at the plant level was sometimes a barrier to participation.

She thought that the mentors at Truck and Bus were quite excellent as a result of the competition to become a mentor. The company made mentoring a full-time assignment and 60 employees had applied for the seven positions.

The MTP teachers stressed the importance of hands-on instruction for the MTP students. Further, they indicated that they relied on cooperative learning strategies, in which students were grouped into teams. The formulation of the teams was an important element in the success of these strategies according to these staff members. The first-year students were very competitive. Therefore, it was important to have balanced teams to keep all of the students on task. The second-year students, on the other hand, who came from more districts, had not yet gelled. The teachers were thus interested in mixing students from different districts. They also felt that implementation of their curriculum was a major accomplishment and that they expected the second year of the program to be more successful than the first because they were more comfortable with the students, curriculum, and program.

The students from the first class indicated that they had found the material from the first year to be interesting, although not too challenging. They felt that MTP had been disorganized during the first year—"lots of surprises"—but that the program was running more smoothly in the second year. One of the students was disappointed about not being able to play football because of his participation in MTP. The students all said that parental encouragement had been the most important factor in their decisions to participate in the MTP Program.

The students described the types of activities in which they were engaged at their worksite (the Truck and Bus Plant). These activities included a "nutcracker project" in which teams of students came up with a design, manufactured their design, and marketed their product. In

general, the students felt that their training was just "more classes," and they expressed an interest in getting onto the (production) floor.

The students from the second year class noted that high school counselors played the pivotal roles in their decision-making process about coming to MTP. Only into the second month of classes, these students were reticent about evaluating the curriculum. One student was very upset about not having a worksite assignment yet, however. His perception was that race was an issue in who got work assignments. He charged that minority students, particularly from Beecher, were not hired. (This student subsequently transferred out of MTP to another Skill Center program.)[7]

We did not visit the Truck and Bus Plant during this visit, but we did get a chance to visit Atlas Technology, which had hired three of the first-year students. This worksite had established an impressive environment for the students. The firm was rotating the students through all of the major departments of the company. However, the students started out in positions that most closely matched the class they were engaged in at the Skill Center. Two of the students were taking the machining class and they were assigned to a machining and design (blueprint reading) operation. One of the students was taking electronics, and he was assigned to work on electrical assembly. Future rotations for the students included purchasing, controls engineering, and sales. The employees and mentors who were interviewed were enthusiastic about the students. They noted that the students were very hard workers and were being productive while they were in training.

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[7]It should be noted that this student's comment was the only concern about race or gender equity concerns that we encountered during the course of the evaluation.

3.3 Visit 2: March 1994

The second site visit occurred approximately six months after the first. The program was in the final weeks of its second year. The first MTP class was preparing for the apprentice test they would be taking in June. The students from that class indicated that they still were not working on "the floor" at the Truck and Bus Plant. Students from the second MTP class were more comfortable with each other and had experienced most of the first-year curriculum. A focus of this round of interviews was on collaboration between organizations. During the visit, we interviewed the MTP program director; the principal of the Skill Center; administrators from Flint, Beecher, and Swartz Creek (a suburban district) Public Schools; students from the first and second classes; and the MTP liaison at Baker College.

The program director indicated that she had been participating in a planning effort to establish a Manufacturing Sciences Center at the Skill Center. MTP would be a part of this broader program. She indicated that the effort was including all of the sending high schools in the GASC service area, and that they were planning to involve other postsecondary institutions besides Mott Community College and Baker College, already partners in the MTP program. These institutions would include the University of Michigan-Flint Campus and GMI.

The program director noted that both Mott Community College and Baker College were preparing for the enrollment of MTP students who were about to complete their second year of the program. The goal of the program was to divide the students equally between these two institutions, but everyone felt that it was in the best interest of all parties to allow the students to choose between institutions. The two colleges had worked out a coordination mechanism to facilitate transfers between them in case students became uneasy with their choice and wanted to

transfer. Staff from both colleges had made presentations to MTP classes and had worked with the students on financial aid applications. A concern of the MTP program director was the transition to postsecondary education for students who do not do well on the apprentice examination. Those students would not be receiving financial support from the MTP partners, and thus would be left on their own to navigate any postsecondary experience.

Among the successes that the program director touted during this visit were the successful recruitment of a third class, which was scheduled to enroll in September, and the fact that the MTP Program was being used as a model for the community to emulate in their school-to-work programs. Her biggest challenge was to continue to modify the MTP curriculum to meet the needs of employers and to infuse academics into the curriculum. Among her goals for the upcoming year were the recruitment of more employer partners, the establishment of preparatory classes for MTP in sending districts, implementation of staff development on the integration of academics into the curriculum, and the development of curriculum documents.

The principal of the Skill Center is responsible for MTP as well as all other departments within his institution. When the MTP Program was being established, he was instrumental in assigning staff and allocating facilities to the program. He decided that he could staff the program with existing Skill Center staff, so that it was unnecessary to recruit teachers for MTP. He felt that Genesee County secondary principals had been fairly supportive of MTP, although the districts had at first been concerned about the fairness of its emphasis on minorities and women.

The principal felt that the MTP Program had been highly successful through its first two years of operation, but he was interested in upgrading the rigor of the curriculum, and in establishing a manufacturing science program that involves many more employers.

The administrator interviewed from Flint Public Schools felt that, in general, the MTP Program was not well known among Flint teaching staff or students. She indicated that the most knowledgeable and supportive teachers were the technical education teachers and the mathematics and physics teachers. The academic teachers seemed to recognize the opportunities that MTP represented for students who had potential. The administrator perceived that her recruitment of students for MTP was constrained by the required sacrifice of extracurricular activities, particularly sports, that is necessitated by participation in MTP. Finally, she reported that the feedback she had received from Flint students in the first two classes of MTP was that the classes are "easy."

We interviewed administrators from two other sending districts as well. In one of the districts, the administrator indicated that the teaching staff was, at first, concerned about the MTP Program pulling students out of other programs, particularly athletics. But teacher acceptance has grown over time because teachers have talked to students and learned about the work at the Truck and Bus Plant and about the postsecondary education opportunities. To foster communication, this district has established an MTP parent group that meets monthly at the high school.

At the other district, we heard a significantly different story about teacher awareness and concerns. Here, very few teachers knew about the specifics of the MTP Program. This district has treated MTP as another program within the GASC. Aside from the high school principal and counseling staff, very few individuals know specifically about MTP. The respondent indicated that local Board of Education approval of the district's participation was neither necessary nor solicited. This respondent had glowing feedback about student involvement in MTP. He noted

that the students in MTP had matured and were more conscious of things like attendance because of the expectations they had encountered at the worksite.

The liaison to the MTP program from Baker College reiterated what the MTP program director had told us about the colleges beginning to prepare for the MTP students. He had given a workshop to the students about financial aid and had established a system within the college for tracking MTP student grades. He indicated that Baker College was prepared to pick up the tuition and book costs of students in MTP who have no other means of financial aid, whether or not they pass the apprenticeship test. The liaison felt that the strength of the MTP Program was its curriculum. Its major weakness was in communication—between the program and students, between the program and parents, and between the program and consortium partners.

We interviewed one of the MTP instructors and asked him about the relationships between the teaching staff at the Skill Center and the mentors at the worksite. These relationships were formal and not particularly close. The teachers and mentors held monthly meetings in which there was an exchange of information, but little interaction. In general, the mentors from the worksites helped to identify skill components that should be developed via the curriculum at the Skill Center, but they did not participate in instructional delivery decisions according to this teacher.

The students we talked to from the initial MTP class, i.e., just finishing their second year in the program, indicated that during the time that they were at the worksite, they were participating in an intensive tutoring effort. In particular, they were working on basic math. One student reported that he had never "worked" at the plant during the first two years of the program, and he was disappointed about this. We interviewed one student from the second MTP class who was also assigned to the Truck and Bus Plant. His sentiments also reflected an impatience about

not getting onto the production floor. The students from the second class felt that a strength of the MTP Program, whose first year they were just completing, was the exposure to tools and equipment and the approach to practical problem solving. These students suggested that instruction could be improved by having less lecturing and even more hands-on instruction. An interesting comment that one of the students made was that students did not tend to develop relationships with Skill Center teachers that were as close as their relationships with home school teachers because the students didn't have the opportunity to stay after class/after school.

3.4 Visit 3: August 1994

The purpose of the third visit was to observe the program as it operated during the summer months. The members of the first MTP class had completed their two years at the Skill Center and had taken the apprentice test in June. The students from the second class had completed the first year of classes and were engaged in their first summer of worksite activities. During this visit, we toured the Truck and Bus Plant training facility, and we visited another firm. We interviewed the MTP program director, mentors from both worksites, and students working at both sites.

The program director indicated that the students from the first MTP class, who were all assigned to the Truck and Bus facility, were working on the plant floor. However, the students from the second class who were assigned to the Truck and Bus facility were actually taking classes at the Skill Center. Both sets of students were being paid for 24 hours of work per week for six weeks of the summer and at a rate of $6.25 per hour. The students at the Skill Center were studying applied math, principles of technology, and introductory automotive technology. The

curriculum development that was being done during the summer involved integrating math and language arts into the curriculum and trying to meet the suggestions of the employers to get quality techniques, statistical process control, and computers into the curriculum.

We interviewed students from the first MTP class while we were on the premises of the Truck and Bus Plant (the students from the second class were at the Skill Center). They told us that they were shadowing journeypersons on the floor and were doing actual production work under the tutelage of those journeypersons. The students were going to rotate throughout the plant with seven different journeypersons. The students told us about taking the paper and pencil part of the apprentice test in June and about preparing for the interview/oral part of the test, which they would take in August.

The mentor from the Truck and Bus Plant confirmed for us the scheme of rotating through a number of work stations with different journeypersons. The mentor told us that most of the plant's employees were accepting the students well, although a few problems had arisen.

The other worksite that we visited was Semtron, Inc. Here three students were working 40 hour weeks all summer long, and were "treated like any other employee," according to the Semtron management official interviewed. Their job duties included light soldering, wrap-ups, and wiring. One of the students was performing general clerical duties in the office area for at least part of the summer. The company was pleased with their experiences with the students, both during the summer and the school year, and felt that the students were being productive employees. Whether or not a student qualified for JTPA wage subsidies was not a key issue for this company. The students liked the company, their co-workers, and the summer employment

opportunities. However, they did not sense a strong connection or relevancy between their job duties and their classwork at the Skill Center.

3.5 Visit 4: November 1994

The purpose of the fourth visit, in the fall of 1994, was to investigate further the experiences of the MTP students who were attending postsecondary programs. Also, we had anticipated learning about the results of the apprentice examination. Unfortunately, we were disappointed on the latter account, since the official results were not available to us at the time of this visit. During the visit, we interviewed the MTP program director and representatives of Mott Community College and Baker College.

The program director was immersed in the recruitment process for the next class of students (those to enroll in fall 1995) and she felt that the program had achieved successes in generating awareness across the county and in garnering more appropriate (eligible) applicants from guidance counselors in the various high schools. We talked briefly about other programs that were being developed in the area that are similar to the MTP model. The FLAG program in the area of financial careers is operating successfully as an offsite program in a local financial institution. Whereas FLAG had been developed coincidentally with MTP, other programs, still in development stages, are systematically copying these models.

The program director indicated that she had not received official results from the apprenticeship test, but that she had heard unofficially that 30/32 students passed the test above the national average.

The Baker College liaison to MTP told us that 13 MTP students were enrolled at the time of the site visit. The students were enrolled in two different program areas: Nine were enrolled in Electrical Engineering Technologies, and four were enrolled in Drafting/Design Technologies. The first quarter was in progress, so he had no way of formally tracking grades. But he was informally monitoring MTP student performance through their instructors, and he reported that they were at least average, if not better, in their classes. Two students were reported to be doing "exceptionally well."

At Mott Community College, 11 of the MTP students were enrolled—all in Mechanical Engineering Technologies. Again, the students were in the middle of their first quarter, so no information was available about how well they were progressing. Mott's main concern was that GM and Jobs Central seemed to be "backing off" from their commitments of financial support for the students in college, and Mott was left having to pay the tuition bills.

3.6 Visit 5: June 1995

The last site visit occurred in early June 1995, just at the end of the third year of classes. The program had blossomed in some directions—student and employer recruitment—but had retrenched in other directions—postsecondary programming. We interviewed the MTP program director, two Skill Center instructors, staff from the Truck and Bus Plant, and a staff person from Atlas Technologies.

One way that this last visit differed from our previous visits was that we collected enrollment data about the status of the MTP students. Table 3-2 presents a summary of the data that we gathered.

Among the challenges that the MTP program director mentioned that she had to resolve was the status of the postsecondary years of the program. She indicated that both Mott Community College and Baker College had rescinded their ability to and interest in supporting MTP students. Both had experienced major staffing changes, and the new staff had not committed to supporting MTP to the extent that had been promised previously. Another challenge that the

Table 3-2

Enrollment and Retention Statistics
(as of 6/95)

	1992/93 Class	1993/94 Class	1994/95 Class
Started 1st Year of Program	50	55	48
Completed 1st Year of Program	32	39	43
Started 2nd Year of Program	32	36	NA
Completed 2nd Year of Program	32	36	NA
Took Apprenticeship Test/ Scheduled in summer '95	32	22	NA
Passed Above National Average	30	NA	NA
Passed in top 5 percent	1	NA	NA
Attended Baker/Planning to Attend Baker	14	13	NA
Attended Mott CC/Planning to Attend	11	6	NA

program director intended to work on was the effectiveness of the program's employer advisory committee. She felt that many useful suggestions about the program had come from that

committee—particularly in the area of curriculum content—but that the concerns and issues from the individual employers were so diverse that it was difficult to hold productive meetings.

On the positive side, the program director pointed to the fact that the MTP Program had become a pivotal piece of the area's school-to-work plan. Perhaps an even more significant success was the fact that several more employers were going to become MTP partners in the fall 1995, including SPO, which is another GM plant. Apparently the MTP program had been publicized enough that employers were aware of its existence and were willing to become new partners.

The MTP instructors whom we interviewed also noted the maturation of the program and predicted that its success was going to make it the kernel of the manufacturing platform being instituted in the county. These respondents noted that curriculum change was a constant force in the program. Employers seemed to be constantly asking for the inclusion of new skills or knowledge into the curriculum, or to reorder the curriculum so that particular skills get covered earlier. Furthermore, the instructors themselves were overhauling curriculum based on their in-class experiences. The instructors reported that the MTP and Skill Center administrators were aware of the need for curriculum development and arranged for the time and resources necessary to accomplish it. A recent change that had been instituted was the introduction of plastics into the curriculum. The intent was to use plastics as a basis for teaching general manufacturing skills such as material stress, packaging and labeling, economics, and robotics.

The staff person who represented the UAW and the Truck and Bus Plant confirmed that 30 out of 32 students from the first MTP class had passed the apprenticeship test above the national average, which was a score of 32. However, the majority of these students scored in the

range of 32 to 34. These scores were not high enough to make it likely for the students to be admitted to a skilled trades apprenticeship from the "outside." (He noted that one of the students did have a very high score and had been offered an apprenticeship, but at a different GM facility.) Consequently, the union and Truck and Bus Plant were taking a different tact. They were hiring the students as production workers. To date, 17 had been hired. Eventually the students could be considered "insiders," and they would have higher likelihoods of getting an apprenticeship. This respondent noted that the scores achieved by the students were five to six points higher than the average for minorities and women in Genesee County, so the MTP program had achieved a significant gain. However, he noted that the average test taker was 35 years old and had 3.5 years of college, so that the MTP students faced severe competition.

The UAW/Truck and Bus staff person felt that the additional tutoring that GM had supplied to the students was quite influential in achieving the level of success on the apprentice test. In the second year of the program, GM had invested in an additional 160 hours of academic tutoring over and above the students' schooling at their home district and the Skill Center. While he felt this had been a key factor in determining the test outcomes, he also felt that this should have been provided by the Skill Center.

In summary, the staff person from the Truck and Bus Plant felt that the MTP Program had been an unqualified success. Several students had become GM employees, and the program had flourished in its brief lifetime despite sometimes hostile environments within the educational, GM, and UAW organizations. When asked how committed the UAW was to the program, he noted that support varied widely from union leader to union leader. Support was strong from some quarters, and skepticism was strong from other quarters.

The liaison to the MTP Program from Atlas Technologies indicated that her firm was fully satisfied with the program and students. The company planned to sponsor one of their students, who was about to graduate from high school, at GMI. She reported that their other student from that graduating class was going to leave the company at the end of summer to attend Ferris State University. (The company considered their relationship with the latter student to have been a total success.) The company liaison reported that Atlas treated all the students as though they were employees, not students. She estimated that the students were at least 70 percent as productive in the tasks that they performed as full-time tenured employees.

The company emphasized rotation among jobs throughout the company with its MTP students. They had been fortunate in summer 1994 to be able to find an ideal mentor for the students. An experienced employee had been on a leave of absence for health reasons and wanted to return to work under accommodating conditions. Mentoring and monitoring the students during the summer had been perfect. This employee had fully returned to his job, so he would not be available for summer 1995, however. The only change or improvement that the Atlas Technologies liaison would like is more worksite mentor training and a mechanism to evaluate mentors. Otherwise, Atlas is extremely satisfied and felt as though they (the company) were "learning all the time."

3.7 Summary of Findings

At the time of this report, the MTP Program is in its fourth year of class offerings. It has had two classes of students who have completed two years of instruction at the Skill Center. Our site visits spanned the second and third year of instruction, and we had the chance to interview

members of both of the classes who have completed the program. Our general observation is that the program has changed over time and that each class has been distinct.

The evolutionary nature of the program has, for the most part, been positive. The program has been learning by doing. In its first year, the program accepted some students who did not meet all of the entrance requirements and found that it had to dismiss a substantial number of students who did not progress sufficiently. As a consequence, the program has been more careful in maintaining its acceptance criteria. The curriculum has changed over the years in response to employers' suggestions and instructors' experiences. The changes have not been dramatic in scope, but rather they have been of a marginal nature, with each change intended to improve the program. It strikes us that the flexibility and adaptability that the MTP program has demonstrated fit well the milieu within which the program's employer partners operate. It is quite appropriate that a program that strives to provide students with world-class manufacturing skills should itself have the flexibility and adaptability that are hallmarks of today's manufacturers.

A change that strikes us as less positive is the retrenchment on promises made to students and the lack of curriculum coordination between the Skill Center and postsecondary education. All parties—the Skill Center, the colleges, the Truck and Bus Plant staff—rationalize carefully that no promises have been broken. But it is clear from early case study notes and program literature that the intent of the program was to support a student's progress toward an associate's degree in Manufacturing Sciences (or a related field) as long as the student passed the apprentice test and made adequate progress toward their degree. The cost of supporting several dozen postsecondary students is greater than what the MTP partners can now afford, and thus the program informs current and future classes that financial support for the postsecondary piece of the program is not

available, unless the students get accepted into an apprenticeship program. It should be noted that the federal JTPA program, which was to have supported much of the training, has been substantially curtailed since the beginning of the program. In retrospect, it was probably a misjudgement on the program's part to have relied heavily on JTPA. At any rate, part of the retrenchment emanates from federal cutbacks in job training.

The MTP Program has succeeded and grown over the course of its short lifetime. However, its scale is modest. It has graduated about 70 students in its first two classes. Major questions that MTP faces are whether it should expand and the extent to which it can expand to serve more students. The program's major constraints on expansion are the number of qualified students it can attract and the number of business partners it can recruit. Our sense is that the program does have the capacity to grow substantially. We further suggest that outreach to and recruitment of qualified students would be the more difficult constraint to overcome. First, parent and community aspirations tend to value most highly the pursuit of a four-year college or university course of study, and thus parents shy away from encouraging their children to entertain the notion of enrolling in vocational education. Second, the students who might be interested in MTP typically do not have the mathematics skills. Business partner recruitment strains should ease over time. Employer involvement has grown over the course of the program, and the task of recruitment of employers should begin to ease as word of mouth among employers spreads.

4. Net Impact Analysis of the MTP Program

4.1 Design of the Net Impact Study

The intent of the net impact study is to answer the question of how outcomes for the students who encounter MTP compare to what would have happened to these young people if MTP did not exist. The focus of the study is on determining net impact rather than gross impact. A gross impact study would focus solely on outcomes and answer questions such as what percentage of students complete the MTP program, what percentage attend postsecondary schooling, and what percentage pass the apprenticeship test. Net impact analyses address questions such as what is the percentage increase in postsecondary schooling attendance because of MTP, and what is the percentage increase in the employment rate of MTP students because of the MTP opportunity.

How is net impact determined? In many scientific disciplines, experiments are conducted where certain subjects are assigned randomly to an experimental treatment, and other subjects are used as controls. In pharmaceutical trials, for example, some subjects are randomly assigned to receive the drug being tested, while others receive a placebo. When random assignment is used, it is possible to attribute differences in outcomes between the experimental and control groups to the treatment because the groups are otherwise identical.

Random assignment designs have been used sparingly in program evaluations, however, because they require that the program being evaluated has excess demand for services. Otherwise program administrators would be denying services to part of the population. Ultimately, it would be nice if MTP would achieve strong enough interest from eligible students to be able to implement a random assignment design. But so far the program has not achieved that number of

applications from *qualified* applicants. So this study uses a comparison group design for the net impact analysis.

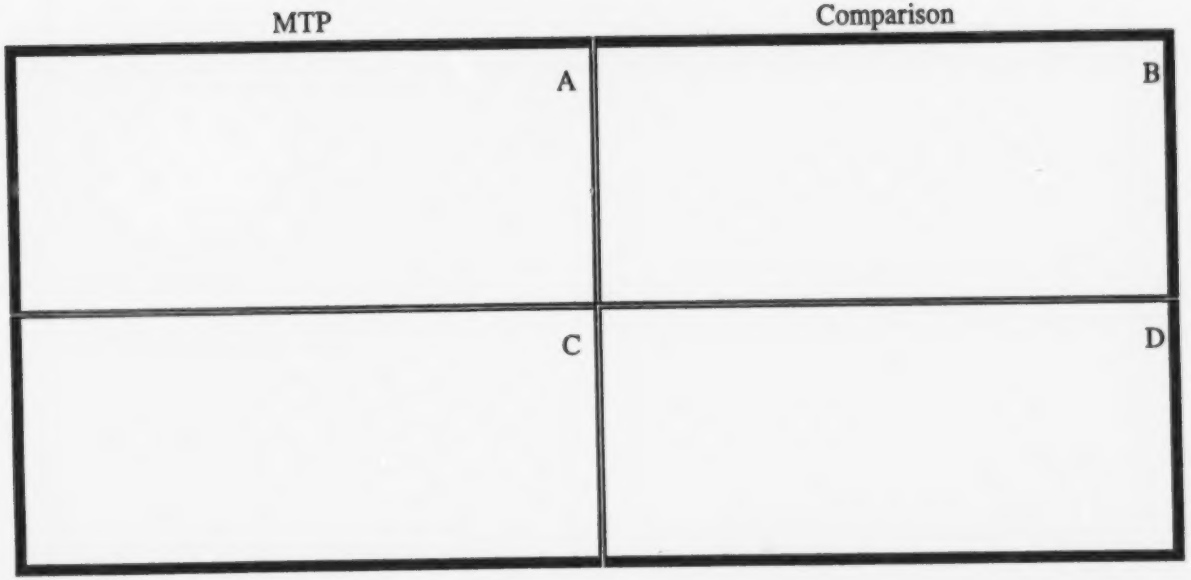
A comparison group design relies on constructing a group of students who are very similar to the MTP students, except that they are not attending MTP. Then the educational and employment experiences are followed for the MTP and the comparison group students, and it is *assumed* that any differences in outcomes can be attributed to MTP. Since random assignment is not being used, the strength of this design depends crucially on how similar the members of the comparison groups are to the MTP students.

When we were first asked to evaluate the MTP Program, we designed an evaluation using four groups of students—young people who started in the MTP Program in fall 1992, enrollees in fall 1993, and comparison groups for each. Exhibit 4-1 illustrates the proposed evaluation design. We suggested that implementation of this evaluation design would proceed by collecting data from each group in fall 1993, 1994, and 1995. The four-cell design would allow comparisons between A and B (the '92 MTP class members and their comparison group), between C and D (the '93 MTP students and their comparison group), and between A and C (the first two MTP classes).

Comparison Groups. As stated, with a comparison group design, the validity of the evaluation depends on having reasonable comparison groups. This evaluation relies on two different strategies to construct the comparison groups for the '92 and the '93 MTP classes. For the former, students who applied to MTP and were interviewed, but who did not enroll, comprise the comparison group. One argument why this is a reasonable group of individuals to use for comparison purposes is that these students were interested in pursuing manufacturing careers just

Exhibit 4-1

Conceptual Study Design



as the MTP students were. Furthermore, they were the same age as the MTP students and came from the same high schools and communities. An argument against this group, however, is that they were not selected for the program. Thus, in some sense, they were "not as qualified" as the students who did enroll. It is possible to overcome this disadvantage statistically, however, because students who were interviewed were rated on a scale from 0 to 100 and this "rating" can be used to adjust the differences in outcomes.

The MTP broadened its intake procedures to recruit students from all high schools in Genesee County for its second class, which enrolled in fall 1993. When project staff were developing the design of the evaluation, the MTP administrators told us that no applications had been received from a substantial number of high schools in the county. We decided to use these high schools as the source of the comparison group of students for the '93 MTP class. Our notion was that we could identify students who would have been eligible for MTP and who might have been interested in it as well, but who didn't apply. The advantages of this design then would be that the comparison students would be "just as qualified" as the MTP students and, to the extent that we were successful in identifying interest in manufacturing careers, they would have similar career motivations. The disadvantage was that we would have to work with high schools that did not actively encourage students to apply.

The actual implementation of the evaluation differed substantially from this design, however, because we encountered several factors that caused us to stray from our conceptual design. First, we learned that the '92 MTP class and comparison groups were composed of both 11th and 12th grades. About half had graduated from high school in spring 1993. Education and employment outcomes will depend on when the students leave high school, so we split the top two

cells in half, as shown in exhibit 4-2 to be able to analyze results by date of high school graduation.

Next, we learned that a number of students who had started the MTP Program in September 1992 were no longer in the program. Some of these students had voluntarily withdrawn; others had not shown sufficient learning progress and were asked to leave the program. We assumed that these students resembled the members of the comparison group (recall that the comparison group was comprised of students who applied for entrance to MTP but were not accepted) and that one year or less of exposure to MTP would not be significant enough to seriously contaminate the comparison group. Thus we decided to include these students in the comparison group, as exhibit 4-3 shows.

The next unexpected program feature that influenced the actual evaluation design was that almost all of the Genesee County high schools were represented in the '93 applicant pool after all. In particular, all of the Flint high schools were represented. It would have been incorrect, therefore, to pursue the original design for the '93 MTP class comparison group since the students from the few high schools with no applicants could not be representative of the entire county.

We ended up pursuing three strategies to construct a comparison group for the second class of MTP students. The first strategy was to recruit students from Saginaw County. Saginaw County closely resembles Genesee in terms of demographic characteristics and in terms of its reliance on GM as a major employer. Due to Privacy Act concerns, the high schools in Saginaw County could not simply release to us the names of students who would be reasonable comparison group members (eligible for the MTP program and interested in a manufacturing career). We

Exhibit 4-2

Actual Study Design - 1st Modification

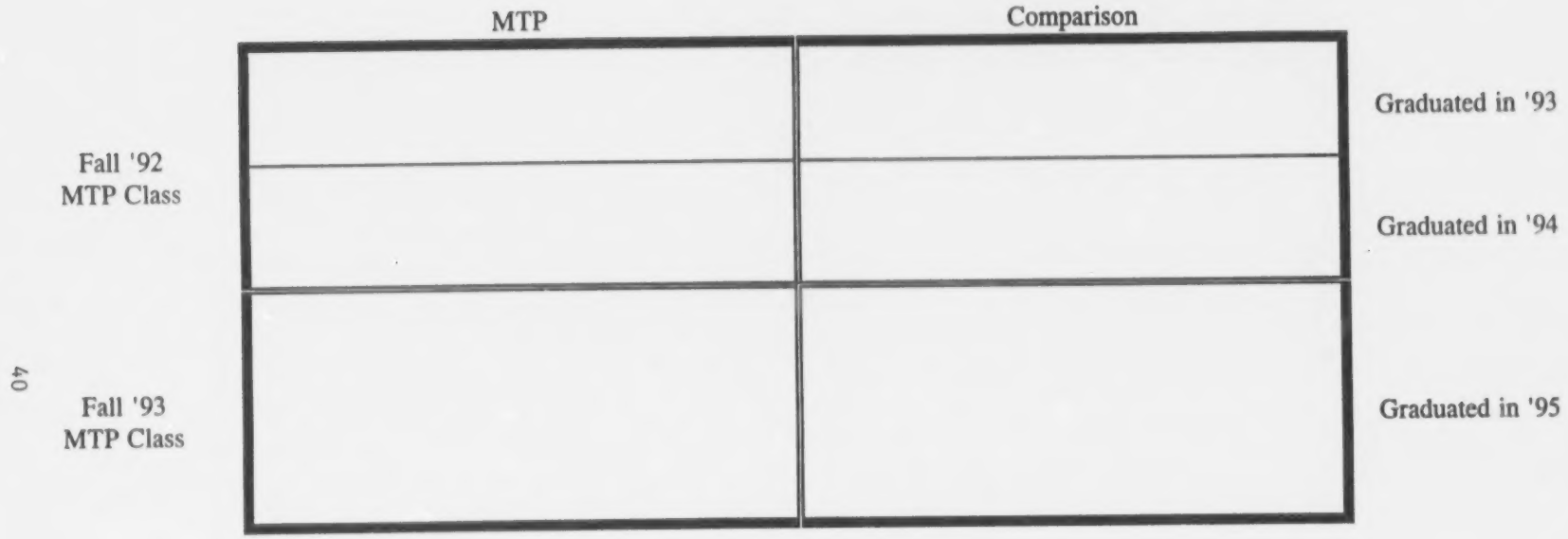
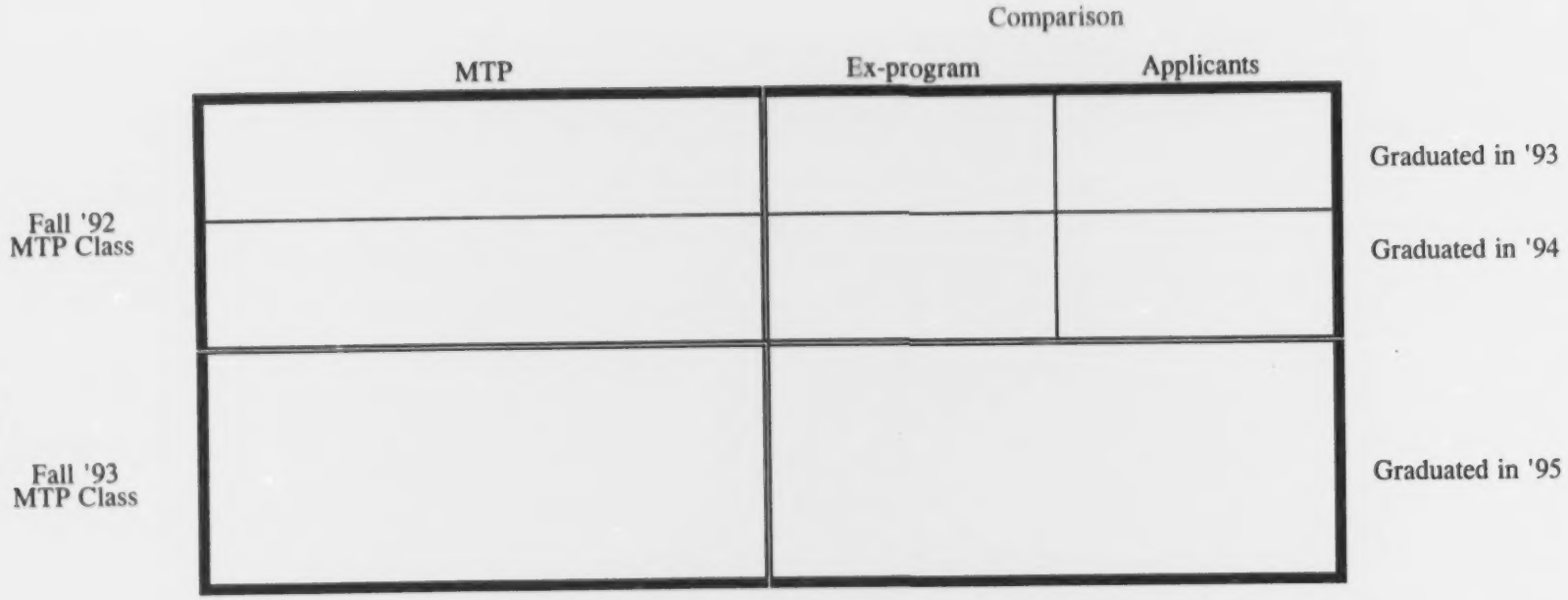


Exhibit 4-3

Actual Study Design - 2nd Modification



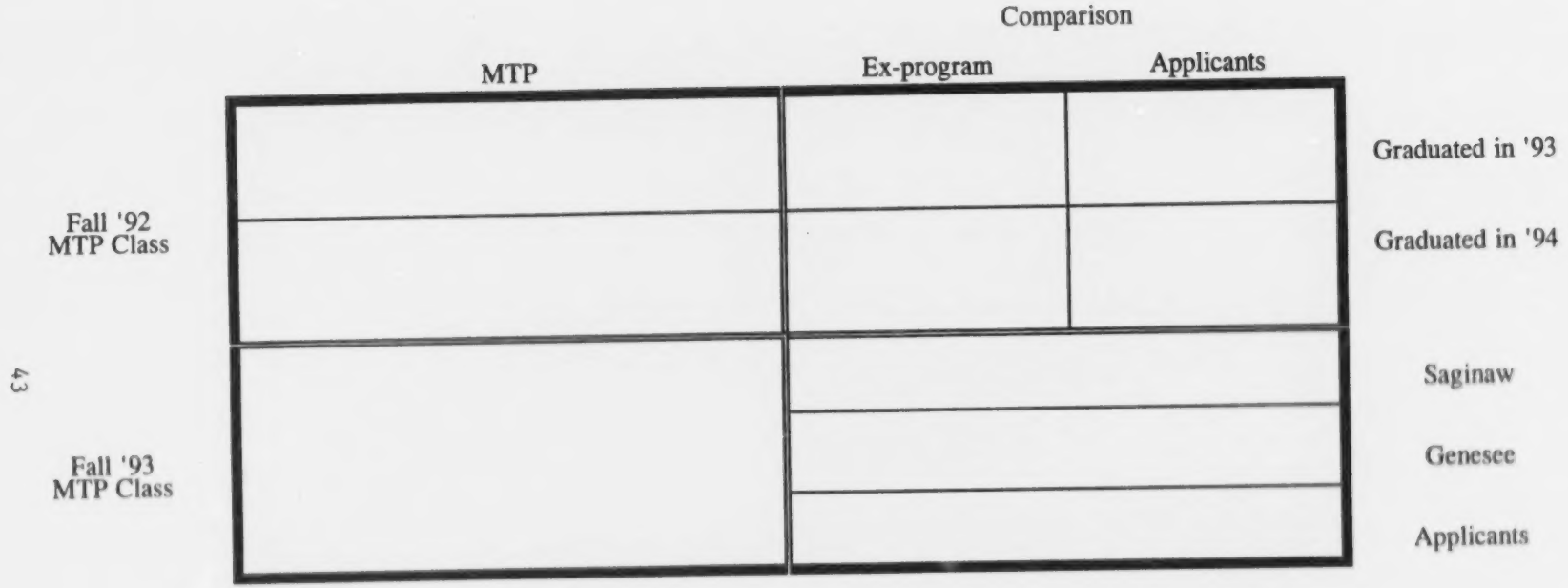
therefore had to get schools to advertise the study and to give interested students a postcard that they could return to the Upjohn Institute. Project staff then sent them a letter describing the study and inviting them to participate in our study by completing a survey. Our intent was to recruit about 100 students this way, interview them all, and screen out students who would not be good candidates for the comparison group (e.g., they were overqualified or obviously aspired to a career outside of manufacturing). We were only able to recruit a total of 32 students, however.

The second strategy that we followed was to recruit students from high schools in Genesee County in a similar way to what we did in Saginaw County. That is, we sent an advertisement about the study to all high schools and asked interested students to return a postcard. This was a second-best strategy because these students would have been exposed to the MTP Program and had chosen not to apply. Nevertheless, we felt that there may be students, particularly in parts of the county outside of Flint, who were eligible for MTP and interested in a manufacturing career, but who didn't apply because of a lack of encouragement from their school or for some other reason. We recruited 13 such students. The final strategy that we followed for the '93 comparison group was to include individuals who applied for the program, but were not accepted into it, i.e., the same strategy used for the '92 comparison group. We ended up including 21 such students.

The conceptual study design that involved four cells turned into an actual design with ten cells, as shown in exhibit 4-4. The statistical analyses presented in this chapter provide summary information for each of the ten cells and aggregate the information to the original four cells.

Exhibit 4-4

Actual Study Design - Final



MTP Enrollments and Evaluation Study Sample Sizes. The MTP program enrolled 50 students in its first class; 24 of these students were seniors in high school and the remaining 26 were juniors. This class had 32 students who completed two years of classes at the Skill Center. These 32 students comprise the first "treatment" group for the evaluation. That is, we compare the outcomes for these 32 students to the outcomes for members of comparison group(s). The comparison group includes nine students who started the MTP Program, but left or were not retained during the first year of classes and 32 students who applied for the program but did not get accepted. Thus the comparison group for the first MTP class totals 41 students.

The MTP Program enrolled 55 students in its second year—all juniors in high school. This class had 39 students complete the two years at the Skill Center. These 39 students comprise the second "treatment" group for the evaluation. We compare them to a group of 66 students—32 from Saginaw County, 13 from Genesee County who did not apply to MTP, and 21 from Genesee County who did apply, but were not accepted or did not enroll.

All together, we have 178 students in the evaluation (71 from the first two MTP classes and 107 comparison group members). For all of these students, we conducted four types of data collection. We conducted a baseline survey in fall 1993 when our project began and all of the students were taking classes. We conducted follow-up surveys in fall 1994 and in fall 1995. Finally, we obtained high school transcripts. Exhibit 4-5 provides the number of data collection completions for each of these efforts. For the baseline survey, we were able to interview 177 of the 178 students. (This is an impressively high completion rate, but it stems from two factors. First, we define membership in the comparison group by completion of the baseline survey, so the "response" rate for them was 107 out of 107. Second the MTP program staff, who

Exhibit 4-5

Study Sample Sizes

PANEL A: All Study Groups

	MTP					Comparison				
						Ex-program		Applicants		
	Enrollment*	Baseline	F-U1	F-U2	Transcripts					
Fall '92 MTP Class	15	15	8	5	9	Baseline:	3	21		Graduated in '93
						F-U1:	2	14		
						F-U2:	1	13		
						Transcripts:	3	21		
	17	17	12	10	7	Baseline:	6	11		Graduated in '94
						F-U1:	4	10		
						F-U2:	2	9		
						Transcripts:	6	10		
						Baseline	F-U1	F-U2	Transcripts	
Fall '93 MTP Class	39	38	35	28	31	32	30	30	30	Saginaw
						13	12	13	13	Genesee
						21	17	15	17	Applicants

PANEL B: Aggregated MTP and Comparison Group

	MTP					Comparison			
	Enrollment*	Baseline	F-U1	F-U2	Transcripts	Baseline	F-U1	F-U2	Transcripts
'92	32	32	20	15	16	41	30	25	40
'93	39	38	35	28	31	66	59	58	60

* Enrollment at end of 2nd year of MTP.

cooperated with us extremely well throughout the entire study, allowed us to conduct the baseline survey during class time. Thus we were able to get responses from 70 of the 71 MTP students.) We requested permission from all sample members and parents to retrieve high school transcripts, and 150 of the members of the sample complied. The high schools in Genesee and Saginaw Counties gave us great cooperation so that we obtained 147 transcripts (= 82.6 percent of total sample).

Sample attrition reduced the number of responses to the two follow-up surveys, as might be expected. To minimize attrition, we offered a $10 payment for completing the surveys. In fall 1994, we obtained a total of 144 surveys; 55 from the MTP students (= 77.5 percent response) and 89 from comparison group members (= 83.2 percent). In fall 1995, the response fell off to 126; 43 from the MTP students (= 60.6 percent) and 83 from the comparison groups (= 77.6 percent). These response rates are quite good for mail surveys. However, the response rate of 46.9 percent for the first MTP class is a reason to be cautious in interpreting the results for that group.

4.2 Student Characteristics and High School Experiences

One of the goals of the MTP Program is to recruit minority and female populations into the skilled trades. Exhibit 4-6 provides data about these characteristics of the students. The starting enrollment for the first MTP class included approximately 70 percent minority students and just over 40 percent female students. The ending enrollment, which constitutes the evaluation sample, included approximately 90 percent minority students and one-third females. The differences between the characteristics of the students at the beginning and end of the program

Exhibit 4-6

Percentage Minority and Female

PANEL A: All Study Groups

		MTP		Comparison: Ex-program		Comparison: Applicants		
		% Minority	% Female	% Minority	% Female	% Minority	% Female	
Fall '92 MTP Class	Starting:	75.0	33.0	100.0	33.3	61.9	57.1	Graduated in '93
	Ending:	100.0	20.0					
	Starting:	61.5	50.0	83.3	50.0	72.7	81.8	Graduated in '94
	Ending:	76.5	47.1					
				% Minority	% Female			
Fall '93 MTP Class				18.8	53.1			Saginaw
	Starting:	NA	43.6	30.8	61.5			Genesee
	Ending:	52.6	34.2	68.2	45.5			Applicants

PANEL B: Aggregated MTP and Comparison Groups

		MTP		Comparison	
		% Minority	% Female	% Minority	% Female
'92	Starting:	68.0	42.0	70.7*	61.0**
	Ending:	87.5	34.4		
'93	Starting:	NA	43.6	37.3	52.2*
	Ending:	52.6	34.2		

Note: Starting (ending) refer to MTP class in Fall of 1st year (June of 2nd year).
** indicates statistically significant difference between the comparison group and MTP (ending) group at .05 level.
* indicates statistically significant difference between the comparison group and MTP (ending) group at .10 level.

indicate that the students who did not complete the program from that first class tended to be whites and tended to be females.

We do not have data on the racial/ethnic characteristics of the beginning enrollment for the second MTP class, although we are aware that it had a smaller share of minority students than did the first class. However, it had a very similar percentage of females as did the beginning enrollment of the first class. By the end of the second year of MTP, the second class comprised just over 50 percent minority students and one-third female students. Again, females had a lower retention rate than males.

The bottom panel of the exhibit shows that the gender and racial characteristics of the comparison group students differ from the MTP students. The comparison groups exhibit lower percentages of minority students and higher percentages of females. With the exception of the percentage minority for the '93 class, these differences are statistically significant.

High school background. Exhibit 4-7 provides data about the students' achievements in high school based on data from their transcripts. In particular, the exhibit displays average high school grade point averages (GPAs) and percentage class ranking. The MTP students had average GPAs of approximately 3.00 (equivalent to all B's). The first class had an average high school GPA of just under 3.00 and the second class just over 3.10. The students in the first MTP class who were in the 11th grade when they began, attained a high average GPA—around 3.40. The average class rank information shows that MTP students, on average, graduated in the top one-fourth of their classes. The first MTP class had a lower overall average high school GPA than did the second MTP class; but they attained higher average class rankings than did the second

Exhibit 4-7

High School GPA and Class Standing[a] (from Transcripts)

PANEL A: All Study Groups

	MTP		Comparison: Ex-program		Comparison: Applicants		
	GPA	Rank %	GPA	Rank %	GPA	Rank %	
Fall '92 MTP Class	2.65	44	2.63	52	2.63	50	Graduated in '93
	3.38	10	2.55	43	2.81	25	Graduated in '94
Fall '93 MTP Class	3.13	29	GPA 3.54	Rank % 22			Saginaw
			3.35	20			Genesee
			2.87	30			Applicants

PANEL B: Aggregated MTP and Comparison Groups

	MTP		Comparison	
	GPA	Rank %	GPA	Rank %
'92	2.97	21	2.66*	42**
'93	3.13	29	3.32*	23

Note: [a] Standing is reported as rank percentile (from top), i.e., 10 indicates top 10 percent of class.
** indicates statistically significant difference between the comparison group and MTP group at .05 level.
* indicates statistically significant difference between the comparison group and MTP group at .10 level.

class—the 21st percentile compared to 29th. Again, the students in the first MTP class who were juniors had very high class rankings—on average, top 10 percent.

A substantial portion of the comparison group members for the study come from individuals who applied to MTP and were not accepted or were enrolled in MTP for a period of time, but discontinued. When we compare the MTP students' high school performances to students in those portions of the comparison groups, the MTP outcomes are significantly higher. In the fall '92 class, the MTP average GPA is 2.97 and the average class rank is the 21st percentile. The outcomes for its comparison group are 2.66 and 42nd percentile. Similar differences occur when we compare the fall '93 class to the comparison group made up of program applicants who were not accepted. The MTP students' average high school GPA is 3.13 compared to 2.87. The class ranks in terms of percentage standing were almost identical, though. The average GPA and class standing for the second class of MTP students are somewhat lower than the comparison groups that were recruited from high schools in Saginaw and Genesee Counties, where we know that the students did not apply to MTP. The GPA difference is statistically significant, but the class standing difference is not.

Two conclusions can be drawn from the GPA and class rank data. First, using GPA and class rank as measures, it seems clear that the program tended to "admit" or "enroll" the "right" students. The average GPAs and percentage standings for the MTP students were superior to comparison groups made up of students who applied to MTP but were not accepted.[8] The second

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[8]It is plausible, although highly unlikely, that the differences stem from the fact that MTP grading policies were easier than whatever courses the unsuccessful applicants took in their home schools instead of MTP.

conclusion is that the evidence suggests that MTP participation is consistent with improved high school academic performance.

We also used high school transcripts to look at the total number of (Carnegie unit) credits that students earned in various subjects. Exhibit 4-8 shows average credits earned in math, science, and vocational education. The first MTP class ended up taking, on average, significantly more math credits and slightly more science credits than did its comparison group. Furthermore, with the MTP credits, the class members ended up with almost one and a half more vocational education credits. These averages imply that the additional vocational education credits did not come at the expense of math or science for this class. However, for the second class of MTP students, some substitution of vocational for academic credits appeared to have occurred. The members of this class participated in over four and a half more credit hours of vocational education, on average, than their comparison group counterparts, but they averaged one-half credit less of math and about a full credit less of science.

The next exhibit, 4-9, provides information concerning the number of extracurricular or co-curricular activities in which the students participated. MTP's structure and schedule do not allow participation in activities that occur after school because the students go to their worksites. The (self-reported) data in exhibit 4-9 confirm that MTP students have much lower rates of participation in high school activities than their comparison group counterparts. The difference in the average number of 12th grade activities is about one for the fall '92 MTP class, although this is not a statistically significant difference (because of the limited sample size). The differences for the fall '93 MTP class are larger and are significant—about 1.5 in 11th grade and

Exhibit 4-8

High School Math, Science, and Vocational (including MTP) Credits (from Transcripts)

PANEL A: All Study Groups

	MTP			Comparison: Ex-program			Comparison: Applicants			
	Math	Science	Voc. Ed.	Math	Science	Voc. Ed.	Math	Science	Voc. Ed	
Fall '92 MTP Class	3.61	2.67	6.17	3.84	2.84	5.67	2.89	2.63	5.16	Graduated in '93
	3.64	2.85	6.86	2.90	2.60	4.60	2.95	2.34	4.97	Graduated in '94
Fall '93 MTP Class	3.10	2.39	6.97	Math: 3.80	Science: 3.49	Voc. Ed.: 1.78				Saginaw
				3.27	3.31	1.81				Genesee
				2.97	3.00	3.81				Applicants

PANEL B: Aggregated MTP and Comparison Groups

	MTP			Comparison		
	Math	Science	Voc. Ed.	Math	Science	Voc. Ed.
'92	3.62	2.75	6.47	3.01***	2.57	5.03**
'93	3.10	2.39	6.97	3.46**	3.31***	2.34***

Note: *** indicates statistically significant difference between the comparison group and MTP group at .01 level.
** indicates statistically significant difference between the comparison group and MTP group at .05 level.
* indicates statistically significant difference between the comparison group and MTP group at .10 level.

Exhibit 4-9

Average Number of High School Activities, Self-Reported

PANEL A: All Study Groups

	MTP	Comparison: Ex-program	Comparison: Applicants	
Fall '92 MTP Class	12th grade: 2.27	4.00	3.05	Graduated in '93
	12th grade: 2.53	3.83	3.55	Graduated in '94
Fall '93 MTP Class	11th grade: 2.34 12th grade: 1.31	4.63 4.87		Saginaw
		3.00 2.75		Genesee
		3.41 2.95		Applicants

PANEL B: Aggregated MTP and Comparison Groups

	MTP	Comparison
'92	12th grade: 2.41	3.37
'93	11th grade: 2.34 12th grade: 1.31	3.91*** 3.85***

Note: *** indicates statistically significant difference between the comparison group and MTP group at .01 level.
** indicates statistically significant difference between the comparison group and MTP group at .05 level.
* indicates statistically significant difference between the comparison group and MTP group at .10 level.

2.5 in 12th grade. For the latter class, the differences are large even if you use only the unsuccessful applicant comparison group—about 1.0 in 11th grade and 1.5 in 12th grade.

4.3 Absences

Exhibit 4-10 provides information, taken from transcripts, about the average number of absences that students had in high school. The inescapable conclusion from the data is that the MTP program reduced absences significantly. In the bottom panel of the exhibit, the difference in the average number of absences ranges from 2.5 to five days per year (these are reductions of 40 to 80 percent). The first MTP class averaged about 2.5 days of absences in 11th grade and 3.5 days in 12th grade, compared to a little over six days in 11th grade and about 8.6 days in 12th grade for the comparison group. The second MTP class averaged about 2.5 and 5.5 days of absences in 11th and 12th grade, respectively, which compares to 6.5 and 8.1 for that class's comparison group.

The exhibit also presents the average number of absences for the MTP classes and for the comparison group students for the grade prior to entrance to MTP. In this case, there is little difference between the students in the MTP classes and the comparison groups. The appropriate interpretation of these data, then, is that participation in MTP reduces the number of reported absences, *not* that MTP tends to choose students who have better attendance records. Presumably the MTP students are coming to school so that they may go to the worksite to earn their $6.25 an hour.

Exhibit 4-10

Average High School Absences (from Transcripts)

PANEL A: All Study Groups

	MTP	Comparison: Ex-program	Comparison: Applicants	
Fall '92 MTP Class	11th grade: 5.32 (pre-MTP) 12th grade: 3.47	4.67 4.00	10.65 9.01	Graduated in '93
	10th grade: 7.88 (pre-MTP) 11th grade: 2.40 12th grade: 3.46	10.10 6.13 10.04	5.70 6.02 8.53	Graduated in '94
		10th / 11th / 12th		
Fall '93 MTP Class	10th grade: 5.95 (pre-MTP)	5.00 / 7.08 / 8.72		Saginaw
	11th grade: 2.56	4.83 / 6.42 / 6.68		Genesee
	12th grade: 5.53	6.27 / 5.85 / 8.57		Applicants

PANEL B: Aggregated MTP and Comparison Groups

	MTP	Comparison
'92	11th grade:* 2.40 12th grade: 3.47	6.05** 8.59***
'93	11th grade: 2.56 12th grade: 5.53	6.52*** 8.08*

NOTE: * Average for students who graduated in '94 only.
*** indicates statistically significant difference between the comparison group and MTP group at .01 level.
** indicates statistically significant difference between the comparison group and MTP group at .05 level.
* indicates statistically significant difference between the comparison group and MTP group at .10 level.

4.4 Postsecondary Education and Labor Market Outcomes

The benefits of the MTP Program should be judged ultimately by the *net* outcomes that it provides for its students. A well-run program that engages students' interests may result in better grades and attendance, but it may be of negligible value if student outcomes are not improved relative to what would have happened absent the program. The first issue to consider in attempting to quantify a program's net impact is to define the outcomes of interest. In this study, we examine primarily the following outcomes: postsecondary attendance, employment rates and wages, and occupational aspirations. We have several reasons for focusing on these outcomes. Postsecondary attendance has been shown to have significantly positive, long-run labor market returns for individuals. Lifetime earnings, wage rates, and receipt of on-the-job training are all positively related to postsecondary attendance. The employment rates and wages are short-run indicators of economic well-being. Finally, occupational aspirations, particularly the desire to enter or continue in technical or craft occupations, relates directly to the MTP Program goal to foster an interest on the part of high school students in entering skilled trades occupations. Our results confirm that MTP participation has positive net impacts on all three outcomes.

Exhibit 4-11 exhibits postsecondary attendance rates. Recall that this study is tracking individuals who graduated from high school in three consecutive years. Half of the first MTP class, which entered the program in the fall of 1992, graduated from high school in May/June 1993. Concomitantly, about half of the comparison group for the first MTP class were in the class of '93 also. The remainder of the first MTP class and its comparison group members graduated from high school in May/June 1994. Finally, the second MTP class and its comparison

Exhibit 4-11

Percent in College Attendance, (Self-Reported)

PANEL A: All Study Groups

	MTP	Comparison: Ex-program	Comparison: Applicants	
Fall '92 MTP Class	Fall '93: 100.0% Fall '94: 100.0 Fall '95: 80.0	100.0% 50.0 0.0	66.7% 57.1 38.5	Graduated in '93
	Fall '94: 100.0 Fall '95: 30.0	50.0 50.0	100.0 66.7	Graduated in '94
Fall '93 MTP Class	Fall '95: 89.3	100.0%		Saginaw
		84.6		Genesee
		80.0		Applicants

PANEL B: Aggregated MTP and Comparison Groups

	MTP	Comparison
'92	Fall '93: 100.0% Fall '94: 100.0 Fall '95: 46.7	70.8%** 69.0*** 48.0
'93	Fall '95: 89.3	91.4

Note: *** indicates statistically significant difference between the comparison group and MTP group at .01 level.

** indicates statistically significant difference between the comparison group and MTP group at .05 level.

* indicates statistically significant difference between the comparison group and MTP group at .10 level.

group students graduated, for the most part, in June 1995.[9] The data in the exhibit summarize self-reported current postsecondary enrollment status information from the baseline and follow-up surveys, which were administered in fall 1993, 1994, and 1995.

The bottom panel of data shows that the first class of MTP students had higher enrollment rates in fall 1993 and 1994 than did their comparison group counterparts and approximately the same rate in 1995. In 1993 and 1994, all of the MTP students who had graduated from high school reported themselves to be pursuing some form of postsecondary education. This compares to about 70 percent of the comparison group members. In 1995, just under half of the MTP students and comparison group respondents were enrolled (according to their own reports). This is a positive result for the MTP Program, but it should be tempered by a few comments.

First, the MTP Program is supposed to include postsecondary instruction for individuals who pass the apprenticeship entrance exam, so *a priori* we would expect quite high rates of attendance. In fact, the drop-off to 30 percent for the MTP students in the first class who were in the 11th grade when they began MTP should be of some concern to the program.[10] Second, by design, the comparison group members were unsuccessful applicants to MTP, so that we would expect somewhat lower educational outcomes for them. Third, the reduction in the rate of attendance in fall '95 for the MTP students may be explained by the fact that a number of them

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[9]There were a couple of students who did not graduate with their "normal" classes because they graduated early.

[10]It is explained, in large part, by the fact that the Truck and Bus Plant hired a number of these students.

became employed by the Truck and Bus Plant and by the fact that some postsecondary programs may be completed in two years or less.

The second MTP class has a postsecondary attendance rate that is not statistically different from the rate of its comparison group (both are around 90 percent). In comparing the MTP students to the three subgroups, we see that the postsecondary attendance rate of MTP students exceeds the rate for unsuccessful program applicants and the rate for Genesee County students who did not apply to MTP but volunteered to be comparison group members for this evaluation. (The latter group comprises students who had higher GPAs and class rankings.) The MTP group only lags behind the Saginaw County comparison group members for this outcome. However, by several measures, the Saginaw County students dominated the MTP students in academic achievements, so it should not be surprising 100 percent of the Saginaw students are in some sort of postsecondary program (compared to about 90 percent for the MTP students).

The next exhibit, 4-12, displays employment and wage outcomes. The data are somewhat confounded by the employment and wages that comprise MTP itself. Where applicable, the exhibit shows these data in a separate row. Each cell of the exhibit contains three items of data for three years—employment rates, average hourly wage rates, and average hours of employment per week for fall 1993, 1994, and 1995. Note that some of these data cover high school years and that some of the data may pertain to part-time jobs held while in college. Also note that these data are self-reported. The wage rate and weekly hours of employment averages are calculated only for those respondents who reported that they were working.

MTP seems to bestow labor market advantages to its participants along all three dimensions—employment rates, wages, and hours. For the half of the first MTP class who were

Exhibit 4-12

Employment Experiences

PANEL A: **All Study Groups**

		MTP			Comparison: Ex-program			Comparison: Applicants		
		% Employed	Avg. Wage	Avg. Hours	% Employed	Avg. Wage	Avg. Hours	% Employed	Avg. Wage	Avg. Hours
Fall '92 MTP Class	Fall '93:	100.0	6.25	12.0 (MTP)	66.7	4.53	12.0	59.1	5.85	15.0
		33.3	4.74	11.0 (Other)						
	Fall '94:	77.8	5.96	35.4	100.0	6.25	48.0	71.4	5.54	35.9
	Fall '95:	80.0	10.69	32.7	100.0	5.50	-NA-	69.2	5.92	32.8
	Fall '93:	100.0	6.25	12.0 (MTP)	50.0	4.58	27.2	72.7	4.03	23.6
		5.9	4.35	17.0 (Other)						
	Fall '94:	50.0	5.41	22.2	50.0	4.75	40.0	55.6	4.83	19.8
	Fall '95:	80.0	9.34	43.0	50.0	5.25	40.0	77.8	5.22	28.8
Fall '93 MTP Class	Fall '93:	---------- NA ----------			% Employed	Avg. Wage	Avg. Hours			
					34.4	4.72	9.0			
					54.8	4.22	14.0			
					46.7	5.69	24.5			
	Fall '94:	100.0	6.25	12.0 (MTP)	38.5	4.22	11.1			
		31.4	5.11	14.6 (Other)	66.7	4.99	14.6			
	Fall '95:	64.3	5.81	31.2	76.9	5.69	26.9			
					31.8	4.44	13.0			
					57.9	4.59	20.4			
					73.3	4.61	24.4			

Graduated in '93

Graduated in '94

Saginaw

Genesee

Applicants

60

PANEL B: **Aggregated MTP and Comparison Groups**

		MTP			Comparison		
		% Employed	Avg. Wage	Avg. Hours	% Employed	Avg. Wage	Avg. Hours
'92	Fall '93:	100.0	6.25	12.0 (MTP)	61.0***	5.01	19.0
		18.8	4.66	12.0 (Other)			
	Fall '94:	61.9	5.68	29.0	65.5	5.35	32.2
	Fall '95:	80.0	9.79	39.9	72.0	5.55***	31.9
'93	Fall '93:	---------- NA ----------			34.3	4.44	13.0
	Fall '94:	100.0	6.25	12.0 (MTP)			
		31.4	5.11	14.6 (Other)	58.1**	4.59	16.1
	Fall '95:	64.3	5.81	31.2	60.3	5.20	25.2*

86

87

Note: NA indicates data not available. Averages do not include zeros. Tests of statistical significance are performed for comparison group versus non-MTP employment of MTP students.

*** indicates statistically significant difference between the comparison group and MTP group at .01 level.

** indicates statistically significant difference between the comparison group and MTP group at .05 level.

* indicates statistically significant difference between the comparison group and MTP group at .10 level.

seniors when they enrolled in MTP, the employment data in fall '95 represents their status almost two and one-half years after high school graduation. The exhibit shows that 80 percent of these individuals reported themselves to be employed at an average wage of $10.69 per hour as compared to just under 70 percent of the applicant comparison group who reported an average wage of $5.92. (Presumably this differential is due partially to a number of ex-MTP students becoming employed at the Truck and Bus Plant.) The average number of hours worked per week is virtually identical for these two groups. However, when the entire first MTP class is compared to all of the comparison group members, the employment rate, wage rate, and average hours of weekly employment are all greater. Only the wage rate differential, which is almost 75 percent—$9.79 per hour compared to $5.59—is statistically significant, however.

The average employment data for the second MTP class and its comparison groups are confounded by the fact that many of these young people are in the first semester of a postsecondary program. The exhibit shows that about two-thirds (64.3 percent) of the MTP students reported themselves to be employed in fall 1995, as compared to just under half (46.7 percent) for the comparison group from Saginaw County and about three-quarters for the two comparison groups from Genesee County. When the three comparison groups are aggregated together, there is not a statistically significant difference between the MTP students and the comparison group members in terms of rates of employment. However, the average wages earned and the average hours of work per week reported by the MTP students at this point are greater than for their comparison group counterparts. On average, the second MTP class members were earning $5.81 per hour and working 31.2 hours per week as compared to $5.20 and 25.2 hours per week.

The data in exhibit 4-13 show the occupational aspirations of the survey respondents. Each cell of the table provides the distributions across four occupational groups at three points in time—fall 1993, fall 1994, and fall 1995. The four occupational groups are professional/managerial occupations, technical occupations (including engineering), crafts occupations, and all other occupations. The goals of MTP might be encapsulated as attempting to get students interested in technical or craftsperson occupations, and indeed, the data show that the program has succeeded for its first two classes. In fall 1993, about one-half of the first MTP class aspired to technical or craftsperson occupations. Two years later, the percentage was almost identical.[11] The other half of the class aspired mainly to professional or managerial occupations. The comparison group members had a much lower percentage of persons interested in technical or crafts occupations and a higher percentage interested in professional/managerial or other occupations. In fall 1995, none of the comparison group members reported that they aspired to a crafts occupation and only one in six wanted to be in the technical occupation area.

The second MTP class also had much larger shares of its students interested in technical or crafts occupations than its comparison groups. However, it experienced a considerable decrease in interest across the three years of the survey. In fall 1993, 75 percent of the MTP class aspired to a job in the technical or craft area, compared to 13 percent for the comparison group. However, in fall 1994 and fall 1995, the percentage of MTP students interested in those areas dropped consecutively, so that the percentage in 1995 was about 44 percent and a majority of the

[11]In between these two dates, the occupational aspirations of the first class of MTP students differed significantly from a year before or a year after. In fall 1994, almost half of the class indicated that they were interested in crafts positions, and about 15 percent indicated an interest in technical occupations.

Exhibit 4-13

Occupational Aspirations

PANEL A: All Study Groups

		MTP				Comparison: Ex-program				Comparison: Applicants				
		% Prof/Mgt	% Tech	% Crafts	% Other	%P/M	% Tech	% Cr	% Oth	% P/M	% Tech	% Cr	%Other	
Fall '92 MTP Class	Fall '93:	26.7	26.7	33.3	13.3	100.0	0.0	0.0	0.0	47.6	19.1	9.5	27.8	Graduated in '93
	Fall '94:	11.1	33.3	55.6	0.0	100.0	0.0	0.0	0.0	64.3	28.6	0.0	7.1	
	Fall '95:	40.0	20.0	40.0	0.0	100.0	0.0	0.0	0.0	53.9	23.1	0.0	23.1	
	Fall '93:	56.3	25.0	12.5	6.3	66.7	33.0	0.0	0.0	72.7	9.1	9.1	9.1	Graduated in '94
	Fall '94:	58.3	0.0	51.7	0.0	66.7	33.0	0.0	0.0	77.8	11.1	0.0	11.1	
	Fall '95:	33.3	33.3	11.1	22.2	100.0	0.0	0.0	0.0	75.0	12.5	0.0	12.5	
						% Prof/Mgt	% Tech	% Crafts	% Other					
						87.1	3.2	6.5	3.2					Saginaw
						87.1	6.5	0.0	6.5					
						86.9	3.3	0.0	10.0					
Fall '93 MTP Class	Fall '93:	16.7	27.8	47.2	8.3	76.9	0.0	0.0	9.1					Genesee
	Fall '94:	34.3	17.1	40.0	8.6	83.3	0.0	0.0	16.9					
	Fall '95:	51.9	14.8	29.6	3.7	84.6	0.0	0.0	15.4					
						59.1	9.1	18.2	13.6					Applicants
						57.9	5.3	21.1	15.8					
						71.4	7.1	14.3	7.1					

PANEL B: Aggregated MTP and Comparison Group

		MTP				Comparison			
		% Prof/Mgt	% Tech	% Crafts	% Other	% Prof/Mgt	% Tech	% Crafts	% Other
'92	Fall '93:	41.9	25.8	22.6	9.7	61.0	17.1	7.3	14.6
	Fall '94:	38.1	14.3	47.6	0.0	71.4	17.9	0.0	10.9***
	Fall '95:	35.9	28.6	21.4	14.3	66.7	16.7	0.0	16.7*
'93	Fall '93:	16.9	27.8	47.2	8.3	75.8	4.6	9.1	10.6***
	Fall '94:	34.3	17.1	40.0	8.6	77.4	4.8	6.5	11.3***
	Fall '95:	51.9	14.8	29.6	3.7	82.5	3.5	3.5	10.5***

Note: Tests of statistical significance are chi-square tests for equality of the frequency distributions.
*** indicates statistically significant difference between the comparison group and MTP group at .01 level.
** indicates statistically significant difference between the comparison group and MTP group at .05 level.
* indicates statistically significant difference between the comparison group and MTP group at .10 level.

MTP students reported an interest in a professional or managerial occupation. For the comparison groups for the second MTP class, between 75 and 80 percent of its members wanted to become professional or managerial employees.

In short, the evidence suggests that the MTP students were positively impacted in all three outcome areas by the program. The rates of postsecondary attendance are higher; average rates of employment, wages, and hours of employments are greater; and the occupational aspirations of students to pursue technical or craft jobs are much greater. In the next section of this chapter, these findings are tested with more sophisticated multivariate statistical analyses.

4.5 Multivariate Analyses of Program Outcomes

Exhibits 4-11 through 4-13 compare average outcomes for the MTP classes to those for the comparison group members. The statistics represent overall averages for the groups, however, and may present a misleading picture of the extent to which MTP leads to particular outcomes if there are substantial differences in the characteristics or experiences of the MTP students relative to the comparison group students. For example, if students are chosen to participate in MTP partly based on their GPAs or test scores, then comparisons of MTP students to young people who did not get into the program are somewhat biased. Studies have shown, and common sense suggests, that students who have higher GPAs in high school will have higher rates of postsecondary attendance. Therefore, as long as grades are a factor in selection, we would expect MTP students to have a higher rate of postsecondary attendance than unsuccessful program applicants. We cannot attribute the higher rates of attendance to MTP.

Regression analysis allows us to see whether the MTP Program results in favorable outcomes while controlling for intervening factors. That is, it literally answers the question of whether or not MTP *causes* a higher rate of postsecondary attendance (or employment or occupational aspirations) for individuals who have *exactly* the same grade point average, credits in high school, gender, minority status, and other measurable background characteristics. Exhibit 4-14 reports the results of regression analyses of three outcomes of interest—postsecondary attendance in fall 1995, employment in fall 1995, and aspiration to a craft or technical occupation as of fall 1995.

The coefficients reported in the table represent the marginal effect of a unit change in the explanatory variable. So, for example, the overall postsecondary attendance rate of this sample of students is 82 percent. Increasing a student's GPA by 1.00 increases his or her probability of being in postsecondary education by .27 (or 27 percentage points). The numbers in parentheses below the coefficients are estimates of the standard error of the estimate, and we traditionally don't ascribe statistical significance to the coefficient unless the standard error is less than or equal to one-half of the coefficient. By this test, none of the coefficients on the MTP variable is significant. That is, we cannot refute the hypotheses that MTP has no effect on the probability of being a postsecondary student, of being employed, or of aspiring to a craft or technical

Exhibit 4-14

Multivariate Analyses of Outcomes

Independent Variable	Dependent Variable		
	Postsecondary Attendance	Employed	Craft/Technical Occupation
MTP	-.01 (.12)	-.27 (.17)	.02 (.13)
High School Characteristics			
GPA	.27*** (.09)	.32** (.13)	-.18* (.09)
Math Credits	.13** (.06)	-.09 (.08)	.06 (.06)
Science Credits	-.05 (.05)	-.02 (.08)	-.03 (.06)
Vocational Credits (including MTP)	.03 (.02)	-.00 (.03)	.05** (.02)
Flint Public Schools	.09 (.09)	-.14 (.14)	.04 (.10)
Saginaw County	.04 (.11)	-.25 (.16)	-.05 (.12)
Activities, Grade 12	-.00 (.02)	-.01 (.02)	-.01 (.02)
Personal Characteristics			
Female	.05 (.07)	-.09 (.10)	-.05 (.08)
Minority	.05 (.08)	.30** (.12)	-.18** (.09)
Mother's Education	-.00 (.02)	-.05 (.03)	-.02 (.02)
Father's Education	.03 (.02)	-.03 (.03)	-.00 (.02)
Dependent Variable Mean	.82	.63	.18
Adjusted R-Square	.30	.05	.21
Sample Size	104	104	104

Note: *** indicates statistically significant difference between the comparison group and MTP (ending) group at .01 level.
** indicates statistically significant difference between the comparison group and MTP (ending) group at .05 level.
* indicates statistically significant difference between the comparison group and MTP (ending) group at .10 level.

occupation.[12] This multivariate approach weakens the findings discussed in earlier sections of this chapter.

The exhibit shows that the only variables that had explanatory power were high school GPA, mathematics credits, vocational education credits, and minority status. Students' GPAs were positively associated with the likelihood of attending a postsecondary institution and being employed. They were negatively associated with craft/technical occupational aspirations. The number of math credits earned in high school is positively related to the likelihood of attending postsecondary schooling, and the number of vocational credits is positively related to the craft/technical occupations. Finally, minorities were 30 percentage points more likely to be employed than whites, but 18 percentage points less likely to aspire to craft occupations.

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[12]The coefficients in the exhibit were estimated using ordinary least squares (OLS) regression. Because the dependent variables were 0-1 binary variables, we also estimated these models with probit regression. The results were very similar. We also used various techniques for dealing with missing variables. For example, the exhibit reports estimates that were obtained by using sample mean values for mother's and father's education in observations for which those variables are missing. The coefficients from models estimated on samples that deleted observations all together that had missing variables were also very similar in magnitude and significance to those reported in the exhibit.

5. MTP Program Successes, Challenges, and Recommendations

Despite facing challenges along the course of its development from concept to the classroom, the MTP Program has achieved many successes. Any policy maker or school-to-work administrator interested in program improvement could learn much by taking the time to investigate MTP's experiences. MTP is an exemplar worth studying. Of course, it should be recognized that the MTP Program has been tailored to a specific environment and circumstances and furthermore is evolving over time. The program still has challenges to address. The purpose of this chapter is to present what we perceive to be program successes and challenges based on our process and net impact studies. The chapter ends with recommendations for the MTP Program to consider.

5.1 Program Successes

Perhaps its most successful accomplishment is that in a rather short period of time, the MTP Program has become a preeminent school-to-work program. It has earned considerable public attention in Genesee County, in the State of Michigan, and even in the nation. It is the core from which Flint area educators are developing their school-to-work programming. The program has expanded along virtually all of its dimensions. In its first year of classes, MTP worked primarily with a single school district and with a single employer (the GM Truck and Bus Plant). In ensuing years, many more districts have sent students to MTP. Also, more and more employers have become program partners. In the span of a half dozen years, the program has gained countywide recognition from educators, from employers, and from organized labor. A

significant aspect of the flourishing of this partnership is that it has occurred in a locality where collaborative relationships have been traditionally difficult to foster.

The program's successes have been recognized in the Genesee County area, but also on the national scene. In June 1994, President Clinton signed the national School-to-Work Opportunities Act while sitting at a desk that was designed and fabricated by MTP students. Several MTP students and staff attended the bill-signing ceremony, at which the president recognized the exemplary nature of the program.

To earn its renown and to have become so well-rooted in the community, the MTP Program must be offering effective program features. This appears to be the case. For example, the program has successfully crafted and implemented a challenging curriculum. The philosophy of the program has been to develop a competency-based (outcomes-driven) curriculum. This curriculum was first developed in close collaboration with staff from the Truck and Bus Plant by Skill Center and other secondary school teachers. Because the apprentice test puts considerable emphasis on basic math and language skills, the curriculum integrated vocational and academic skills—before such integration became in vogue nationally. The curriculum development team has consistently included academic teachers.

As the program got off the ground, the teachers and administrators have not been hesitant to alter the curriculum. In fact, major changes have been instituted virtually every summer since the program began enrolling students. These changes have come mainly in response to employer suggestions. The employers who became new partners in MTP operated in different industrial sectors from the Truck and Bus Plant and were interested in having students develop different skills. The program thus has attempted to accommodate these interests, as long as the skills were

generic. That is, MTP is not intended to provide customized, specific skill training for particular employers. Rather, MTP has maintained its emphasis on academic integration and, in fact, has recently added a physics teacher to the curriculum team to assist in the integration of science.

In addition to careful attention to the curriculum, the MTP Program has tried to provide instructors and students with appropriate equipment. The machining and electronics courses were based in labs that had been equipped for the Skill Center's ongoing (non-MTP) curriculum, and the facilities and equipment were reported to be quite satisfactory by staff, students, and employers. Similarly, drafting and design is offered at the Skill Center to MTP students and students in other curricula. This course was offered in a classroom with several computers that were used to teach CAD. In this instructional area, the program staff felt that even more computers and software were needed since mechanical drafting is becoming obsolete. The lab where the principles of manufacturing course was taught needed, and got, the largest investments in equipment during the period of time over which we visited the program.

Another success of the program is the degree to which employers feel ownership of it. For example, the staff from the Truck and Bus Plant refer to the program as "our program." This may not be too surprising, given the genesis of the program. However, interviews with representatives from other employers indicated a strong sense of ownership as well. At one (small) business, the staff person with whom we talked indicated that the owner had made a firm commitment to sponsor two or three students every year of the program. At two of the businesses, staff told us that loss of JTPA subsidies would in no way diminish their organization's involvement with MTP. In short, several employers seem to have made strong commitments to the MTP Program as a way to improve the supply of skilled workers in the future.

Of course, the bottom line for the MTP Program is the students it is serving. Through our site visits and data collection, we became aware of two student success stories, but probably program staff could relate many others. The type of success that the MTP Program is aiming at is epitomized by a minority individual in the first MTP class who scored in the top five percent on the apprenticeship test. He has been hired into a skilled trades apprenticeship at one of the area GM plants and is well on his way to a stable, high-paying career within a year after graduating from high school. Another student, a minority female, from the second MTP class has established a long-term employment relationship with an area small business. She worked for this employer during her first two years in the program, and the employer has subsequently decided to sponsor further education for her in an engineering discipline at GMI. The employer hypothesized that without MTP, the company would have been highly unlikely to take a chance on a high school student, like this young lady.

Staff from the Truck and Bus Plant felt that the MTP Program was responsible for improving significantly the apprentice test scores of the young people who had participated in it. They indicated that it was rare for individuals just out of high school to score above the national average; and yet 30 out of 32 students from the first class did so. The competition on this test is severe. Literally thousands of individuals take this exam, including many adults with substantial postsecondary education. To have over 90 percent of the students pass indicates a high level of success.

A final program success is the number and percentage of female students that it is steering into manufacturing careers. Over one-third of MTP graduates were female. The program has

received national recognition for its efforts to encourage females to enter nontraditional occupations, and the statistical picture of its graduates bears this out.

5.2 Challenges

The MTP Program has achieved many successes, but it also has several challenges to address. Perhaps its greatest challenge is to integrate successfully a postsecondary component to the program. It is not unfair to say that the goal of the partnership has broadened over time from *attempting to get students to pass the skilled trades apprentice test* to *preparing students for rewarding careers in manufacturing*. After all, many additional employers besides the UAW/GM team have joined the partnership. However, even under the more narrow, original goal, the program recognized the importance of strong postsecondary preparation. In the early design of the program, students who passed the apprentice test, but did not get offered an apprenticeship were going to be entitled to a two-year degree in a manufacturing-related field at either Baker College or Mott Community College.

However, as we observed the program over its first three years of instruction, we noted that little attention was paid to the postsecondary component. The program did not carefully track where individuals attended postsecondary programs, nor did it attempt systematically to stay in contact with former students. Furthermore, as we discussed in previous chapters, the program's partners have been conflicted about whether financial support promises were made to students and by whom. Because of personnel and structuring changes at the two-year institutions in the area, former MTP students have been essentially cut loose to make it on their own.

A second major challenge for the program is the integration of work-based and school-based learning. An important premise of school-to-work programs is that the context of work activities would reinforce or enhance learning. Students will get to see the practical application of their skills and knowledge, i.e., skills will be learned in a hands-on fashion. However, it seems clear that there must be significant coordination between the employers and program instructors to achieve these ends. With MTP, we observed a considerable level of input from employers into what got taught in the school-based portion of the program. But we found scant evidence of any attempt to coordinate what was being done in the workplace with what was being learned at school.

Another challenge that MTP must address concerns the relationships between employer partners in the program. The joint UAW/GM staff at the Truck and Bus Plant seem to be most interested in developing the MTP students to be able to pass the apprentice test at a very high score. Other employers do not want to lose "good" workers to GM. The Truck and Bus Plant is a large organization with a number of corporate standards and practices in place. Other employers are much smaller and more flexible in operation. The employers operate in different industries and hire workers for different occupations. The Truck and Bus Plant is unionized; other firms are not. In short, the program must struggle to keep all employers happy and, at the same time, to attract new partners.

The program's participation by females is outstanding, but it also presents a challenge. In analyzing application and retention rates, we found that females were overrepresented among the individuals who applied to MTP but did not get accepted *and* among the individuals who started the program but did not complete. The program may have a limited ability to influence

its applicant pool (to get more capable females to apply or to develop the skills of females who will apply), but it can accept the challenge of providing better support mechanisms for the young women who it does accept.

A final challenge for the program stems from economics. Given the modest number of program graduates (70 in the first two years) and given the substantial teaching, equipment, and curriculum development costs that the program incurs, it must be the case that the program's costs per student are quite high. The challenge is to increase the number of students served (which we suggest is quite feasible), to control and reduce costs, or to face increased scrutiny into the cost of offering the program.

5.3 Recommendations

With this general discussion of program successes and challenges as background, we suggest that the MTP Program consider the following recommendations:

1. **Develop pre-MTP skills enhancement classes for 9th or 10th graders or for elementary levels.** The MTP Program should have an interest in upgrading the math and communication skills of potential students. This would strengthen the quality of the applicant pool and program participants, and would expand the pool to more students in the county. The immediate target audience for a skills upgrading program would be 9th and 10th graders. In addition, initiatives aimed at K-8 students may be very effective. However, these initiatives go beyond MTP and should be undertaken by school districts or consortia. Several options exist for developing a program in the first two years of high school. For example, strengthening the basic skills components of the curricula in home

districts' technical education classes that are taken by 9th and 10th grade students could be attempted. A special program at the Skill Center could be developed either during the school year or in the summer months. Home districts could develop courses or other opportunities to strengthen the math and communication skills of potential Skill Center students. In short, any and all efforts toward upgrading the basic skills of potential MTP participants should be pursued. Successful students from MTP classes would be good spokespersons for the program—either in person or on videotape.

2. **Reinvigorate the postsecondary component of the program.** The MTP Program began as an articulated secondary/postsecondary program (it might be characterized as a 2+2, Tech Prep program). Students who had high scores on the apprentice test would be accepted into an apprenticeship program and would pursue the formal postsecondary training within its structure. Students who passed the apprentice test would be offered the option of enrolling in an associate's degree program in manufacturing sciences or a related technology. Students who did not pass the apprenticeship test would be discontinued from the program.

Over the course of its first four years, the postsecondary element of the MTP Program has been lost. There are a number of reasons why. First of all, employers other than General Motors have become partners in the program, and they typically do not have structured apprenticeship programs. Their interests lie in developing skilled employees for their own operations. Second, as discussed above, the Truck and Bus Plant, Baker College, Mott Community College, and Jobs Central have indicated that they cannot afford

to support students in college. Third, the MTP Program has not followed up on the progress of students after they graduate from two years at the Skill Center.

We suggest that reinvigorating the postsecondary component of the program can and should be done. First of all, articulation agreements with as many postsecondary institutions as possible should be negotiated so that students who complete two years of MTP at the Skill Center will have a substantial number of transferable college credits. Second, MTP should require the support of students at postsecondary institutions from employers to the extent possible. Third, the MTP Program should make a more concerted effort to monitor the progress of students who "pass" the apprenticeship test and enter a postsecondary program. Perhaps, the Skill Center could be the location of one of these students' required classes (taught by college staff, however). Alternatively, the colleges could be required to track student progress and report it to the MTP Program as part of their partnership agreement.

3. **Institute work-slot rotation in the 11th Grade.** We recommend that the program consider a formal rotation scheme in the first year of MTP. Students would rotate among job sites and, even within a site, would rotate among different departments. The program currently operates by having employers interview students at the beginning of the 11th grade. With minor MTP intervention, matches are made between the students and employers. The expectation is that the student will remain with the employer for the rest of the program (if not, the rest of his or her career). Matches, currently made at the beginning of 11th grade, could be improved if they were made at a later time after both

parties have more information. Furthermore, with more flexibility, the program could have periods during the year when students were not assigned a job site and would be able to participate in extracurricular activities at their home schools.

Suppose, for example, that the first three-quarters of the year were broken up into three, nine-week periods when students could rotate through two or three worksites. (A student who wanted to pursue an extracurricular activity could request that he or she be excused from a worksite assignment during one quarter.) Employers could evaluate the progress and potential of various students during their "rotation." Then selection of employer-student matches could be made toward the end of the third quarter. Students would then be assigned to the firm for the fourth quarter of their junior year and would be expected to work for the firm over the summer and into their senior year.

The advantages of such a rotation scheme would be that it would improve the quality of the matches between students and companies, the program could serve more students, all students would get a placement for at least three quarters of their junior year, students would get a broader introduction to the industry, and it would allow limited involvement in extracurricular activities. The disadvantages are that the logistics of such a scheme would be difficult to solve (transportation and scheduling, for example) and employers may not want to mentor students they have not screened. Furthermore, employers would bear the costs of training additional students.

4. **Improve the coordination of school-based and work-based learning activities.** The advantages of work-based learning may be substantial. Students are provided a context

for learning. They apply their knowledge. They are more motivated because they are getting paid for their time. However, these advantages disappear if there is no coordination between the work-based and school-based learning. The worksite mentors and the MTP instructors must determine the learning objectives for the program together and must decide where (at which site) each objective gets taught. If employers are simply using the worksite time to provide training to an entry-level employee, then of what use is the Skill Center instruction?

The burden of coordination lies with the MTP staff. They should have program objectives determined and should assess what types of activities and learning will occur at the worksite. Then they can ensure that gaps between the overall program objectives and the learning that will occur at the worksite are filled with instruction at the Skill Center. Students need to relate what they're learning at the worksite to the skills and knowledge they are mastering at the Skill Center. Assessment can be done by having students prepare a written log of the types of activities they are engaged in at the worksite and how those activities relate to their classwork. Alternatively, the MTP staff can develop some sort of authentic assessment of the skills and knowledge that the students are presumably acquiring during their work-based learning activities. In short, the students need to be accountable for their learning at both the worksite and the Skill Center.

5. **Re-energize the MTP Advisory Committee.** A major emphasis of the school-to-work movement is to forge collaborations between employers, organized labor, and educational institutions. MTP is an exemplary school-to-work program in many ways. However, it

appeared as if some of the collaborative arrangements between partners were strained. At the time of the last site visit, we learned that the advisory committee had not met for several months. All parties should recognize that collaboration is hard work and that disagreements need to be worked out. The MTP Program should reconvene periodic meetings of the partners, and the committee should debate whether it is sensible to form subcommittees to enhance the productivity of the partnership. If the overall committee is having difficulties, it would be advisable to get some training on group dynamics and teamwork. Not meeting and relying solely on one-to-one communication will not solve problems and may be counterproductive in the long run.

6. **Establish support mechanisms for female MTP students.** Manufacturing careers are traditionally male-dominated, which is one of the reasons that the MTP Program was started—i.e., to target females and minorities. The program is to be applauded and has been recognized for the success it has had in attracting females. Over one-third of its graduates have been young women. However, the statistical picture drawn from a careful analysis of applications, interviews, and retention suggests that females were disproportionately represented among unsuccessful applicants and program leavers. We want to make it clear, in no uncertain terms, that we did not encounter any gender bias in any of our interviews or data collection. In fact, the program director, one of the Skill Center's instructors, and several of the GM/UAW mentors present exemplary role models for young women. Nevertheless, we point out that the program's success may be enhanced even further by tutoring or support groups for females.

7. **Monitor program per student costs and strive to reduce them.** In the course of this study, we attempted to examine program costs over its short lifetime. We expected to see substantial start-up costs and downward trends in costs as the program matured. Unfortunately, the Skill Center's accounting procedures could not separate MTP costs from other similar instructional programs. We surmise that area administrators or even the Skill Center board may begin to focus their attention on the economics of the program. To date, the number of program completers has been modest, and program costs seem to have been substantial. (Of course, grants and in-kind subsidies from employer partners have been received.) To anticipate this attention, we suggest that the program increase its enrollment, which we believe to be feasible, or control or reduce its costs.

School-to-work programs such as the MTP Program have the potential to improve significantly the educational experiences and career prospects of America's young people. The extent to which these programs achieve their potential should be consistently monitored and evaluated. The MTP Program has achieved successes, but as with the manufacturing sector of the economy, it should be striving for a total quality approach. We hope that the findings and recommendations of this study will provide the impetus for a feedback loop that enhances the program.